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ABSTRACT

The four papers prepared by the Far West Regional Laboratory are intended to serve as a model for designing an Employer-Based Career Education (EBCE) program. The authors of Chapter 1, Instructional Model: Bases and Rationale, have discussed underlying concepts and principles. Basic student provisions include: basis for job choice, orientation and experience in several jobs; development of minimal marketable skill; basic academic education; and cognitive, personal, and social competence. Organizational concepts focused on: behaviorally stated objectives, instruction in a functional context, performance-based instruction, learner-managed instruction, and guidance-oriented teachers. Chapter 2, Instructional Model: Intended Outcomes and Content, is directed to a discussion of the student-centered instructional system. Chapter 3, Instructional Model: Processes of Instruction, emphasized (1) the importance of clearly aligning instructional goals and establishing content before selecting processes of instruction and (2) the effect of being too encapsulated by the premise of group classroom instruction in conceptualizing instructional processes. The impact of personal/social/cognitive/career learning are examined in relation to the environments of skill acquisition, applied problems, and seminar. The concluding chapter, Instructional Model: Implementation and Management, has outlined steps in assessing the community, selecting EBCE jobs, and developing the instructional program. (EA)

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CONSIDERATIONS ON THE DESIGN OF AN INSTRUCTIONAL SYSTEM FOR EMPLOYER-BASED CAREER EDUCATION

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May 1972

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CONSIDERATIONS ON THE DESIGN OF AN INSTRUCTIONAL SYSTEM FOR EMPLOYER-BASED CAREER EDUCATION

Preface

The four papers that follow were written in fulfillment of a contract with the Far West Regional Laboratory in Berkeley, California. That laboratory was given the responsibility of developing an Employer-Based Career Education (EBCE) model as part of the Office of Education's total program in career education. These papers, along with others being written by other agencies, were prepared to serve as guides and summaries to the many issues and problems involved in designing a career-education system. The papers were intended for the consortium of businessmen who were to participate in the creation of the career-education program.

The Far West Laboratory divided the complicated issues surrounding the design of an employer-based career education program into approximately 17 study areas. The purpose of the papers was to examine each study area, consider the state of present knowledge and practice within the area and specify its implications for the design of the EBCE model. Although there is undoubtedly considerable interrelationship among the 17 study areas, time restrictions did not permit an exchange of information about the content of each draft among the several agencies responsible for paper preparation.

The chapters presented here address several different aspects of the design of the instructional model.

Chapter 1, entitled "Instructional Model: Bases and Rationale," introduces and discusses the concepts and principles under which the

instructional model was to be organized.

The main topic of Chapter 2 is: goals and content of the instructional model. It discusses the implications of "who shall state goals" and the concept of a student-centered instructional system.

Chapter 3 discusses the processes of instruction -- through what means and methods should students learn? The fourth and final chapter is concerned with the procedures by which the instructional system could be implemented and managed.

The underlying rationale of the four chapters was to display the ramifications and implications of the concepts and principles under which the instructional system was to be organized. For example: What is entailed by permitting students to choose their own goals? What are the implications of permitting students to select among learning experiences? The chapters also contain recommendations on strategies for implementing and managing the model and designing a student-centered curriculum.

The authors did not think it appropriate to provide a unitary answer to each of the problems or issues. Because the answers to design problems reflect judgement, experience, and even differing philosophies, the authors in each chapter isolated and stressed the issues that struck them as most pertinent and germane.

We have united these four chapters under a single cover because they have a common central concern -- the design of an instructional system for career education. Although each chapter moves toward a single set of issues, together they move toward most of the major

issues in creating a system:

The implications of the goals and the organizing concepts of the EBCE.	Chapter 1
The mechanism by which goals and outcomes are selected.	Chapter 2
The ways and methods the system will use for instruction.	Chapter 3
A plan for implementing and managing the system.	Chapter 4

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Chapter 1

INSTRUCTIONAL MODEL: BASES AND RATIONALE

Elaine N. Taylor and Robert Vineberg

I. INTRODUCTION

This is the first of four papers which discusses the EBCE Instructional Model. Primarily introductory, this paper introduces broad goals and organizing concepts which have implications for the design of the entire model. The topics discussed in the remaining three chapters are: Chapter 2 - Intended Outcomes and Content; Chapter 3 - Process; and Chapter 4 - Implementation and Management.

The Office of Education has given guidance as to the breadth of EBCE. EBCE is to provide a comprehensive education--one which merges the world of education with the world of work. Thus, EBCE represents a combination of education and training. Education and training may be contrasted in a variety of ways.

Educational content and structure are derived from objectives based upon assumptions or presumptions about the nature of society and the present and future demands it may make on individuals. Training content and structure are derived from objectives based upon specific knowledge and skills needed to support performance of particular tasks or jobs. Thus, educational objectives are inherently broad and rationally defined, whereas training objectives are rather specific and empirically defined. Education can continue indefinitely whereas training typically has a clear point of termination.

Education and training have in common that once their particular objectives have been specified, such objectives provide the basis for the development of the various components of the instructional model: instructional content and organization, process (hereafter referred to as instructional methods, media, and strategies), evaluation procedures, and a system for the implementation and overall management and control of the instructional process. The broad goals and organizing concepts of EBCE to be discussed in this paper have implications both for identification of the initial objectives and for their translation into components of the model.

In this paper these broad goals and organizing concepts are defined. Each goal and each concept is then examined to determine its particular implications for instructional content and organization of content and for instructional methods, media, and strategies. Then the interactions of goals and concepts are considered to determine their implications for each of the succeeding chapters. Requirements for implementation and management arise as a direct consequence of the implications derived for content, organization, and instructional methods, media, and strategies. In the remaining chapters, then, various options for dealing with these implications are presented. Chapter 2 (Instructional Model: Intended Outcomes and Content) deals primarily with instructional content and its organization. Content is here defined as "...what the student has to learn which should enable him to perform as described in the objectives."[1] Thus, content consists, primarily of information--

[1]Far West Laboratory for Educational Research and Development; "Preliminary Report, Initial Systems Analysis of Employer Based Career Education," Vol. 2, Feasibility Study Areas, p. 2 of Study Area No. 8.

information upon which knowledge is based, information which mediates the performance of particular acts (for example, job performance) and enabling information which provides a basis for the acquisition of other information. Included in the present definition of content are those experiences other than the direct exposure to information which are necessary for the development of skill. Skill cannot be acquired solely through the communication of information.[1] The organization of content refers primarily to the sequence in which information is presented. The amount of information to be included in any discrete learning experience, or module, can be considered another aspect of the organization of content.

Chapter 3 (Instructional Model: Process) deals primarily with techniques for facilitating learning through the selection of alternate instructional methods (e.g., whole vs. part), media (e.g., film vs. live instruction), and strategy (e.g., individually paced vs. group paced instruction).

Chapter 4 (Instructional Model: Implementation and Management) deals with the detailed step-wise plan for placing the instructional system in operation. It includes the development of student flow models; assignment of staff responsibilities; communication, record-keeping, and measurement procedures; development of instructional and other materials; and identification of logistic requirements.

As has already been noted, consideration of each individual goal produces implications which are relevant to instructional content

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[1]The distinguishing characteristics of skill and the necessary conditions for its acquisition are discussed in a later section, pp. 31-36.

and its organization. Consideration of individual organizing concepts produces implications which are also relevant to the organization of content, as well as to instructional methods, media, and strategies. Various combinations of goals and organizing concepts interact to produce additional implications. All implications for content, its organization, and for instructional methods, media, and strategies, whether they be derived from individual goals or concepts or from combinations of goals and concepts, in turn impose requirements upon implementation and management.

II. STATEMENT AND DEFINITION OF GOALS AND ORGANIZING CONCEPTS

A. Goals

The EBCE is to be designed around a central theme: the development of career competence, both vocational and avocational. It endeavors not only to prepare the student for the present but also for life-long involvement in the world of work and the world of leisure. It implies the development of flexibility to: (1) cope with changing job patterns and requirements; (2) deal with the increasing availability of time for avocational pursuits in a personally meaningful and satisfying manner; and (3) adjust to major social change. Each student is to be provided with the following:

1. Basis for Job Choice. In order that students may make reasoned decisions about career or job choices, they will acquire information about a variety of jobs. Information to be obtained will include: (1) an appraisal of placement and salary opportunities for a number of jobs; (2) information about requirements (skills and knowledge required,

duration of training and apprenticeship status, physical demands, opportunity for advancement, general work conditions, specific work rules and safety regulations, and requirements for affiliations with unions, etc.); (3) job seeking procedures such as how to inquire about employment, consult classified ads, make a job application, and conduct oneself during a job interview; and (4) familiarization with job description reference materials.

2. Orientation and Experience in Several Jobs. Once the student has acquired information about a variety of jobs, he will select several in which he wishes to gain work experience. Since these experiences will be some of the earliest in each student's involvement in EBCE, considerable effort should be given to providing as meaningful and as satisfying an introduction to the work (and learning) environment as possible. The orientation to each job should be comprehensive. In particular, attention should be devoted to providing the student with a clear understanding of what he will gain from his work experience and what demands will be placed upon him. At this stage experience with each job will be of sufficient scope to enable students to identify the one or two jobs in which they plan to initiate the development of actual occupational skill. These initial exposures to different jobs are likely to occur successively rather than simultaneously. In making each new selection, students should be encouraged to choose jobs having distinctly different characteristics.

3. Development of Minimal Marketable Skill. After the student has had experience with several jobs, he will select one or more in which he plans to acquire entry level job proficiency

The program must provide each student with some minimal marketable skill whether he chooses immediate employment, additional advanced education, or elects to follow other pursuits before seeking employment. There is no implication that he will necessarily remain in a job for which he receives minimal training on a long-term basis. The intent is to provide each student with an understanding of the world of work--its satisfactions and obligations--and to provide him with a source of income while he completes his education or whatever additional training he may require should he later elect to change jobs or occupational fields. On the other hand, a student may seek a continuing career in that job in which he first develops minimal occupational skill. It is incumbent upon the EBCE to provide training and experience sufficient for the student to attain a minimal marketable skill.

4. Basic Academic Education. Each student will acquire a core of basic educational skills such as reading, writing, and arithmetic needed for day-to-day commerce with society. The core program is prerequisite to the development of long range competence in the four domains: cognitive, personal, social, and occupational.

5. Cognitive, Personal and Social Competence. Cognitive, personal and social competencies will be acquired in an extension of the basic core program. Cognitive skills include gathering, organizing, analyzing, synthesizing, and evaluating information and applying the products of these actions in making decisions and solving problems.

Personal competence involves the development, integration, and adoption of a system of values. Implicit in personal competence is an understanding and application of principles of: physical and mental health, purchase of goods and services, and maintenance of personal property.

Social skill involves both an understanding and application of principles involved in interacting with other persons and groups and the development of responsibility to the group and the larger community. Anticipating one of the organizing concepts of EBCE, the major part of instruction is to occur in work settings. Since in most instances, this implies considerable social interaction beginning with the student's entry into the program, the development of social skill is of paramount importance.

Social skill includes the ability to: communicate effectively with others, understand other persons and one's self in relation to them, and accept others and adjust to their needs. For example, a person must be able to interpret the behavior of others and be aware of their needs and feelings. He must develop awareness of how his own behavior affects others. He must perceive and respond to social reality, i.e., be responsive to group norms and expectations and to informal group structure.

Development of responsibility to the group and the larger community includes a willingness to familiarize one's self with social problems and participate in their solution, and to be informed on issues of local and national importance--in short to act as a responsible citizen.

6. Optional Educational Experiences. The five preceding goals involve basic requirements for all students of the EBCE program. They include educational and training experiences which are directly related to a person's adequate functioning in society and in a vocational setting. They lead to growth in the vocational, cognitive, personal, and social domains. There remains, however, an almost limitless variety of other topics and experiences which contribute to a full and satisfying life. Some have been part of more traditional academic curricula: the fine arts, the humanities; biological, social, physical and political sciences; literature and writing; languages, and so forth. Others such as athletics, music appreciation and participation, dancing, and crafts have traditionally represented non-academic subjects. Provision must be made with EBCE for a student to pursue such electives in school settings, through self-study and lecture programs, and through more general exposure to the cultural and recreational life of the community at large. The student will be aided in assessing, developing and pursuing his own interests, needs, and abilities. Such options will provide exploratory experiences leading to more adequate vocational choice and identification of life goals and leisure interests and pursuits and enhance the student's capability for coping with problems of expanding leisure, earlier retirement, and similar social changes. In addition, exercising these options will extend growth in the four domains.

7. Positive Attitudes About Self, Education and Work. All of the broad goals or outcomes thus far discussed have been defined in

in terms of particular types of information and experience to be included in the EBCE. Two additional outcomes for students of the EBCE have been prescribed by the Office of Education and the Far West Laboratories for Educational Research and Development, respectively: the development of (1) positive self-concepts and (2) receptivity to continuing formal and informal education and to work. A positive self-concept is defined in terms of the extent to which an individual feels a sense of personal worth and fulfillment, a sense of direction and of control over his environment and his own life. Such descriptors as self-confidence, self-respect, and satisfaction with one's role in life become part of the definition. A positive self-concept and receptivity to continuing education and work are not engendered through the inclusion of specific content in an instructional program. Rather, they will develop only as a consequence of the adequacy and meaningfulness of the entire EBCE. As a person acquires an orientation to the world of work, selects a career which is meaningful to him, develops the cognitive, personal and social skills and knowledge which enable him to perform, and realizes that he possesses such competencies, then a positive self-concept should emerge. As a person develops a positive self-concept through participation in EBCE a positive association with education and training and the world of work should occur. Awareness of success in the job he has selected, feelings of job satisfaction, personal growth and well-being should all contribute to receptivity to continuing education and training which in turn should enhance the likelihood of long range personal and career success.

B. Organizing Concepts

There are five organizing concepts or policies governing the development of the instructional model. These concepts are:

1. Objectives will be stated in behavioral terms.

2. Insofar as possible, instruction in basic academic education (the core program) and development of skill and knowledge in the four domains will be integrated and provided for within a functional context.

3. Acquisition of skill and knowledge and its assessment will be performance-based, i.e., founded upon an active and observable display of student behavior.

4. The student will direct and manage his own individualized instructional sequence.

5. Teachers and other staff will assume a guidance function, rather than a pedagogical one.

A unifying theme underlying the first three concepts is that the educational and training process will occur through the performance of meaningful activities. All five concepts are described in more detail below.

1. Behaviorally Stated Objectives. Behaviorally stated objectives are specific descriptions of observable behaviors that the student is expected to display or products that he is to generate as a result of his learning experiences. This includes behavior such as an oral display of a particular item of information or knowledge, a demonstration of the ability to solve a specific quantitative problem,

and the exhibition of particular manual or motor operations. A behavioral objective may be stated in terms of written, verbal, or material products or physical operations.

A behavioral objective includes not only a statement of the behavior or performance required but also a description of the conditions under which performance occurs and the level or standard of performance considered adequate. To demonstrate this concept, two examples will be given, each with an improperly and properly stated objective. The properly stated objective includes an indication of (a) performance; (b) conditions; and (c) standard.

Example:

a. The student will be able to read German (improper objective).

b. The student will be able to (1) read and translate (2) a particular article in the German version of the Reader's Digest in (3) X minutes (depending upon the length of the article). The translation will be comparable in meaning to the same article as published in the English version of the Reader's Digest (proper objective).

Example:

a. The student will diagnose ignition system malfunctions (improper objective).

b. The student will (1) identify a sparkplug with a disconnected lead (2) in a six-cylinder engine that is "missing." (3) He will identify the sparkplug within five minutes (proper objective).

2. Instruction in a Functional Context. Instruction in a functional context means that learning is to occur in a situation in which the material or operations being learned are given meaning through their application to the accomplishment of specific goals. Functional context can be provided within a job setting, a simulated setting, or within any variety of settings suitable to avocational pursuits. The primary requirement is that the learner interact with his environment through application of his newly acquired knowledge or skill. Clearly, if the learner is to recognize that the material or skill he is learning has utility, he must be in an environment which provides him with a recognition of his action or contribution and, if possible, with feedback as to its success or failure. These requirements are most readily provided for in so-called real life situations, whether they be vocational or avocational. Providing as much of the educational and training instruction within a functional context as possible will serve a variety of purposes.

a. Where instructional material, whether it be part of the basic educational core or any of the four domains, can be related to an obvious need or function it is likely to have more meaning for the student than were it to be provided in a more abstract setting. Student motivation should be enhanced through the demonstrable utility of material to be learned.

b. With the integration of separate instructional elements in a coherent whole, the interrelationships among cognitive, social, personal, and vocational skill become evident. If vocational

or avocational training is compartmentalized the interactive role of the four domains is less likely to be recognized.

c. Motivation to learn is augmented as the student becomes aware of the dependence of others upon him for specific contributions and products. He begins to develop a sense of responsibility which extends beyond his own needs.

d. Through exposure to persons with different backgrounds, values, and interests the student's understanding and appreciation of goals and satisfactions different from those held by him or his peer group is broadened.

e. In a work situation the opportunity to observe persons in roles of greater responsibility provides the student with a picture of the industrial heirarchy and the possibility of job advancement that can occur with the acquisition of additional knowledge and skill. (Receptivity to continuing education and training was indicated earlier as one of the broad goals of EBCE.)

f. A functional learning environment provides a setting where successful performance can occur in a real rather than abstract academic situation. Successful performance in such a setting is, therefore, more likely to contribute to the development of a positive self-concept. Again, a positive self-concept, based upon the rewards of learning and successful performance, should promote a positive attitude toward continuing education and training.

g. Embedding education and training in a functional context virtually insures that learning and assessment will be performance

based. Performance based instruction is an organizing concept of EBCE and is discussed next.

3. Performance Based Instruction. Performance based instruction is characterized by the active and observable display of behavior both during learning and assessment. Performance based learning occurs largely through the demonstration of desired behavior or operations to be performed and is accompanied by imitative acts on the part of the student. Student behavior is compared to the demonstrated behavior either during the student's performance or immediately thereafter. The instructor may analyze the student's ongoing actions and/or the student himself may compare his own behavior with the example or standard. Adjustments and refinements occur in further repetitions of the operation. While the instructor often provides supporting and explanatory information and guidance during the process, the emphasis is upon performance rather than upon information giving. Performance based instruction is most appropriate as an instructional approach where skill is to be acquired. Skill refers to behaviors that are not completely mediated by knowledge or information.[1]

The major determinants of performance are knowledge, skill, aptitude and physical ability, motivation, and personality characteristics. Estimates of performance capability can be made through attempts to measure these separate elements. Such a procedure requires an inference about the relationship between any of these separate elements and the total act to be measured. Performance based assessment, which

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[1]See later discussion in IV. INTERACTIVE IMPLICATIONS OF GOALS AND ORGANIZING CONCEPTS, part D, p. 27.

occurs as a natural consequence of performance based instruction, avoids the need for such an inferential process and typically provides a more perfect estimate of proficiency.

Performance based instruction has the following additional virtues:

a. It insures that the student has acquired and understands information to which he has been exposed. It cannot always be assumed that because persons have been exposed to information and can reproduce it that they understand the information and will be able to apply it in the work situation.

b. Performance based instruction forces a student to organize information that he has learned. For example, a student file clerk may have a knowledge of the subject categories under which information is to be filed and knowledge of the definitional characteristics of each category. With performance it can be assured that the student will properly relate content of material to be filed to the appropriate category.

c. Usually the application of information in a performance situation is more rewarding than the sheer acquisition of knowledge. A student is rewarded when he discovers that information he possesses can be used in dealing with real problems.

d. Performance also serves a diagnostic function informing the student of whether or not he possesses the necessary information to perform a task. Where a learner has only a general knowledge of how a task is to be performed, or where he possesses only some of the necessary

information, performance will permit him to refine his information and enable him to identify and gather that which he still needs.

4. Learner Managed Instruction. Under a learner managed instructional system each student will progressively assume greater responsibility for his own program. Features of a learner directed program are:

a. Voluntary enrollment in the program - Entry into the program is purely voluntary.

b. Free entry and exit - A student may enter the program at any time. Likewise he may leave the program, receiving credit for whatever he has accomplished, at any time. He can re-enter the EBCE at will (whether or not he has spent the intervening time within the traditional school system).

c. Student selected goals - A student may elect to pursue any of the specific job/education programs being offered. He is responsible for the identification of his own goals and objectives. He has the option of adjusting and modifying his goals at any time.

d. Self-paced instruction - The student's acquisition of skill and knowledge is not time-bound. Individualized instruction will enable the student to proceed at his own pace.

e. Self-evaluation - The student decides when he is ready to be examined for any given module of instruction. Some evaluation will be self-administered.

f. Choice of media - To the extent possible students will be permitted to select the type of media they will use to supplement

performance based instruction in an instructional sequence: e.g., direct observation, film, video tape, textbook, programmed text, taped lecture, etc.

5. Teacher Role Emphasizing Guidance and Management of Instruction. Instruction will be individualized and students will assume considerable responsibility in the selection of goals and instructional programs. Hence, the role of teachers and other staff will shift from that of being primary purveyors of instruction to roles in which they aid students in their self-pursuits. Teachers and other staff will perform as content and media experts and bear a heavy role in providing students with guidance as they move through EBCE. Workers in the job situation may perform a more traditional teaching function.

Perhaps the single most important responsibility of the teacher is to manage instruction to maximize the likelihood that students will be exposed to a series of successful experiences. Success can be provided for only through the careful sequencing and organization of content and the selection of appropriate instructional procedures. It is essential that the teacher be aware of the student's aptitude and learning requirements and that the teacher continually monitor student progress and adjust instructional content and strategy to promote success.

III. IMPLICATIONS OF INDIVIDUAL GOALS AND ORGANIZING CONCEPTS FOR CONTENT, INSTRUCTIONAL METHODS, MEDIA AND STRATEGIES AND IMPLEMENTATION AND MANAGEMENT

First in this section, individual goals are examined for their implications for instructional content and its organization. Next organizing concepts are examined for their implications for organization of

content and instructional methods, media, and strategies. It will be observed that goals do not carry implications for instructional methods, media, and strategies, and organizing concepts do not carry implications for instructional content per se.[1] It should also be understood that all implications which are derived from goals or concepts impose requirements upon implementation and management. There are no implications specific to implementation and management independent of those affecting content, its organization, and methods, media, and strategies. For this reason, this section does not contain separate statements of implications of goals and concepts for implementation and management. Such statements would merely be duplications of all other implications.

A. Implications of Goals for Content and Organization

1. Goal 1 - Basis for Job Choice. Content to provide a basis for job choice must include coverage of three elements: (1) information about job requirements for a number of jobs (skills and knowledge required, duration of training and apprenticeship status, physical demands, opportunity for advancement, general work conditions, specific work rules and safety regulations, and requirements for affiliations with unions, etc.); (2) an appraisal of placement and salary opportunities for a number of jobs; (3) job seeking procedures such as how to inquire about employment, make a job application, and conduct oneself

[1] While organizing concepts do not carry direct implications for content, the concept of Behaviorally Stated Objectives clearly stipulates the nature and specificity of intended outcomes of instruction. The major determinant of instructional outcome is instructional content. Hence, the concept of Behaviorally Stated Objectives delineates content and imposes requirements upon it.

during a job interview; and (4) familiarization with job description reference materials.

The student should become acquainted with some minimum number of job families as part of the accomplishment of Goal 1. Ideally, each student would become acquainted with all job families represented in the consortium and would be provided with information about how to obtain knowledge concerning additional jobs external to the consortium. The instructional system should provide and acquaint the student with such reference materials as The Dictionary of Occupational Titles and publications on occupations obtainable from the U.S. Government Printing Office.

In providing a basis for job choice, content should be organized in the sequence given in the preceding paragraph. In this way, the information about job requirements provides a context for salary and placement information. It avoids a contradictory ordering of values by placing emphasis upon job characteristics and potential personal satisfiers before introducing monetary considerations. The sequence as outlined provides for practice in social skills which presumably would transfer to the more critical need for social skill in a job seeking situation. Information about job characteristics provides a context in which a student can most meaningfully and advantageously organize his personal qualifications when making application for a job, prepare his vita, etc.Introducing the student to reference materials as a last step in the sequence places the student in a position where he can relate this more abstract material to his prior learning.

2. Goal 2 - Orientation and Experience in Several Jobs. In providing work experience in several jobs students should be encouraged to select jobs with quite different characteristics in order to provide as broad a base of experience as possible. Similarly, in establishing the sequence in which job experiences will occur, the student should be advised to move from jobs of lesser to jobs of greater complexity.

Orientation content must be carefully selected in order to provide a meaningful and satisfying introduction to the work situation. This is particularly important since, for many students, these experiences will be their first continuing involvement with the world of work. The student must enter with a clear understanding of the demands that will be made upon him. He should also receive some forecast of the knowledge, skill, and satisfactions he will obtain. Clearly, every effort must be made to insure that the student's initial exposure to work results in a positive experience. As examples, if punctuality in reporting to work is important, the student must be made aware of the exact time he is to arrive and its relative importance. If adherence to safety regulations or regulations about cleanliness are important, these must be emphasized during the orientation. Failure to fully prepare the student for job demands is likely to result in expressions of dissatisfactions by supervisory personnel or in disapproval by his co-workers, occurrences which are avoidable if anticipated through adequate orientation.

Criteria defining an adequate work experience must be established. These criteria should reflect the scope of experience which is

sufficient for the student to determine whether or not he wishes to remain in a job for the development of minimal marketable job skill.

3. Goal 3 - Development of Minimal Marketable Skill. A basic tenet of the EBCE is that a student emerging from the program possesses a minimal marketable level of job skill. While a student might not desire to remain in the job for which he received training in the program, his skill level should be sufficient to permit him to seek and obtain a job if he desires. Further, the salary that he would obtain in the job should be sufficient to sustain him while he prepared for another job, should he so desire. Thus, a starting point for establishing criteria for minimal marketable job skill is a determination of an adequate salary for self-support. Once this is determined those jobs and job levels which would provide such a salary can be identified. Finally, content in the form of the requisite skills and knowledge necessary to support performance in these jobs and job levels must be specified.

Goal 3 carries no particular implication for the manner in which content is organized.

4. Goal 4 - Basic Academic Education. Those basic educational objectives which are necessary for day to day commerce with society and which are prerequisite to further education and training in the cognitive, personal, social and vocational domains must be defined. Content necessary to attain these objectives must be identified.

In sequencing this content, priority should be given to that which is necessary for daily commerce with society rather than that

which is prerequisite to further education and training. Some students may leave the program prematurely. These students should be equipped, at least minimally, for functioning in society.

5. Goal 5 - Cognitive, Personal, and Social Competence. Those behaviors defining cognitive, personal, and social competence must be defined and content selected in accordance with these objectives. Since social skill plays a major role in the EBCE, where students are responsible for seeking information in job settings and other situations requiring interactions with other persons, it is suggested that content sequence give priority to the development of social competence.

6. Goal 6 - Optional Educational Experiences. Goal 6, as it is defined, carries no specific implications either for the identification of content or its organization. Optional educational experiences available to the student, however, should include content that will permit development in the avocational domain as well as an extension of competence in the cognitive, personal, social, and occupational domains.

7. Goal 7 - Positive Attitude About Self, Education, and Work. Goal 7 carries no implications either for the identification of content or its organization. As discussed earlier (see discussion of Goal 7, pp. 8-9) a positive self-concept and receptivity to continuing education and work will develop as a consequence of the adequacy and meaningfulness of the entire EBCE.

B. Implications of Organizing Concepts for Organization of Content and for Selection of Instructional Methods, Media, and Strategies

1. Concept 1 - Behaviorally Stated Objectives. Concept 1 carries no implications either for the organization of content or for instructional methods, media, and strategies to be used in the communication of content. (See footnote 1, p. 18.)

2. Concept 2 - Instruction in a Functional Context. Instruction in a functional context dictates that the organization of content be accomplished in accordance with the following principles:

(a) Content describing task goals should precede content prescribing task procedures. Where goals are described first, the subsequent learning of procedures is made more meaningful.

(b) Content should be sequenced in an order which permits the immediate application of information. The learning environment should be arranged to provide the student with knowledge of the effects of his performance as immediately as possible.

(c) Content should be arranged from simple to complex. Information should be presented in small increments. Both of these practices will increase the likelihood of student success.

(d) The presentation of practical content (concrete information and specific rules and procedures) should precede the presentation of theoretical content (abstract rules and principles). Organizing content in this sequence will again increase the likelihood of student success. More abstract and theoretical content will be introduced at a time when it can be made more meaningful by relating it to previously

learned specific practical content. A student should be expected to acquire only that theoretical content which is necessary to support further learning or performance.

(e) In functional context training the sequence in which content is presented should parallel the procedures used in actual task performance. Thus, where a task involves an analytic procedure such as in the trouble-shooting of electronic equipment, content is sequenced in a "whole to part" or analytic manner. The functions of major sub-assemblies, such as transmitters and receivers, are taught first to permit the student to use symptom information in isolating the malfunctioning sub-assembly. Next the functions of circuits within sub-assemblies, such as amplifier or oscillator circuits, are taught to permit localization at the circuit level through signal tracing. Finally, functions of individual parts, such as resistors or capacitors, are taught to allow the student to isolate the specific malfunctioning piece through static and dynamic circuit analysis.

Where a task is accomplished through synthesis or integration of materials, such as in dressmaking, content is sequenced in a "part to whole" manner. Laying the pattern pieces on the material would be taught first. Next, techniques for cutting the material would be indicated. This would be followed by instruction in how to mark the pieces (tailor-tacking, use of tracing wheel, etc.). Then instruction would be given in the manner in which the assembly of pieces is to occur, including stay-stitching and pressing techniques. Finishing techniques would be taught last.

Instruction in a functional context is a particular instructional method in a particular setting. It presumes a high degree of fidelity between operations performed during learning and operations performed in accomplishing a real life task. It implies that media used during instruction should be the same as those used in performing the task itself. For example, job aids such as manuals and check lists should be used as training media. Insofar as possible instructor personnel should be indigenous to the task situation (e.g., job incumbents) and tasks should be real tasks.

3. Concept 3 - Performance Based Instruction. Performance based instruction dictates that the organization of content be accomplished in accordance with the following principles:

(a) Content should be sequenced to permit immediate and continuing performance of tasks or task elements. Content should be organized into modules which contain a minimum of verbal instruction or lecture prior to performance by the student.

(b) While increments of content must be small enough to insure success (see Concept 2 above - Instruction in a Functional Context), they must contain enough information to support the performance of an observable action.

(c) Where a real-life situation requires the synthesis of various elements of information, content should be organized so that students are given the separate elements and required to integrate the information themselves. For example, in reaching a decision about which breakfast cereal to buy, students would be given infor-

mation about the food value and costs of different brands. The student would select the brand to be purchased.

Performance based instruction is a particular instructional method. It is the method most crucial to the development of skill. Skill cannot be acquired solely through the communication of information but requires practice. The major implication of performance based instruction for instructional strategies is that opportunities be provided to acquire skill through practice.[1]

4. Concept 4 - Learner Managed Instruction.

(a) Content modules must be small and have associated achievement or performance tests to permit maximum credit for accomplishments whatever exit and re-entry may occur.

(b) Insofar as possible content modules should be self-contained, i.e., require minimal prerequisite knowledge. Organization of content in this manner will facilitate student entry and re-entry into the program. In addition, it will permit greater freedom of choice in a student's selection and ordering of instructional modules.

(c) Since instruction is to be learner managed, content must be organized to permit individualization of instruction including provision for self-pacing with a minimum of assistance from the instructional staff.

Methods, media, and strategies must be adopted which are consonant with individualized, self-paced instruction. A wide variety of

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[1]Perceptual, motor, cognitive, and social skills and the role of practice in their development are discussed in a later section. (Pages 31-36.)

media should be made available to provide learning materials in a number of different modes so that each student may select the mode he prefers. Insofar as possible tests that can be self-administered should be used.

5. Concept 5 - Teacher Role Emphasizing Guidance and Management of Instruction. Content is to be organized to provide both a responsive environment and to promote the likelihood of student success. (See Concept 2 - Instruction in a Functional Context above.) The primary role of the teacher is to monitor student learning and to insure that content, as it is organized, is accomplishing these goals. Where it is not, the teacher is responsible for seeing that appropriate adjustments are made.

Prescriptions for methods, media, and strategies in a learner managed system, where the teacher's role is primarily to provide guidance and management, have already been given. (See Concept 4 - Learner Managed Instruction above.) Since this system emphasizes student choice in the selection of media, it is the teacher's obligation to provide the student with information about characteristics and availability of various optional media.

IV. INTERACTIVE IMPLICATIONS OF GOALS AND ORGANIZING CONCEPTS

In addition to the implications of any single goal or organizing concept for the design of the EBCE instructional system, a few additional implications emerge when goals and concepts are examined in combination.

A. Goal 1 - Basis for Job Choice
Goal 2 - Orientation and Experience in Several Jobs
Goal 3 - Development of minimal Marketable Skill

Goal 4 - Basic Academic Education
Concept 4 - Learner Managed Instruction
Concept 5 - Teacher Role Emphasizing Guidance and Management of Instruction

One of the basic goals of EBCE is to provide each student with a basic academic education comparable to that of a graduate of a traditional school system. Indeed, guidance from the Office of Education states: "Graduates of the program will be assured credentials as least equal to those offered by the public school system." While pursuit of such a goal is desirable, it suggests a risk in that students would be required to assimilate much of the very same content that had in many instances proved unpalatable during earlier schooling in a traditional mode. While providing a basic academic education may be a primary goal of EBCE, it is suggested that it be given secondary status at least during a student's early interactions with the program. Once a student has acquired some job-related experiences (Goals 1 and 2) and begun to gain positive feelings about the program, basic academic educational content should be introduced and, to the extent possible, directly associated with the acquisition of job information and skill.

A second consideration in establishing goal priorities and giving highest priority to Goals 1, 2, and 3, is that in a learner managed program students can exercise the option of leaving the system at any time. Faced with the prospect that a student might exist from the program and all formal education prematurely, it is extremely desirable that he be given job experience and preparation as early as possible.

The teacher's role in providing guidance to students in the early stages in the program should reflect this ordering of priorities. A teacher's orientation to the program should emphasize this philosophy.

B. Goal 1 - Basis for Job Choice
Goal 2 - Orientation and Experience in Several Jobs
Goal 3 - Development of Minimal Marketable Skill
Concept 1 - Behaviorally Stated Objectives

The first three goals of EBCE imply a progression of involvement in the world of work. Initially a person receives a broad overview of a multiplicity of jobs. Information about any particular job is necessarily limited. In two successive stages the focus narrows finally to one or more jobs in which the student becomes intensively involved. Information and skill are acquired in some depth. These three goals are critical to the functioning of EBCE and most clearly differentiate it from other educational programs. Organizing instruction around these goals provides a student with a means for entering the world of work, motivates him, and supplies a framework or setting in which other learning can take place.

A clear and satisfactory demonstration of goal attainment to the student is crucial and is most likely to occur when goals are accompanied by properly stated behavioral objectives. The knowledge which is to provide a student with the basis for job choice must be carefully specified. He must be able to compare one job with another on the same dimensions. The extent and type of activity that defines his orienting experiences must be explicated. Minimal marketable skill levels must be identified and the student must be provided with evidence that he possesses a marketable skill. Behaviorally stated objectives provide both the teacher and the student with the only logical means of assessment. In a

conventional school setting the teacher must be satisfied that particular goals have been attained. In EBCE it is equally important that the student become aware of his achievements and, in particular, that he be able to recognize each new accomplishment.

C. Goal 4 - Basic Academic Education
Goal 5 - Cognitive, Personal and Social Competence
Concept 2 - Instruction in a Functional Context

When the goals of providing a basic academic education and cognitive, personal, and social skill in a functional work context are considered, a most immediate requirement is an analysis of candidate jobs. The extent to which these goals can be met through instruction and training in candidate jobs must be assessed. This assessment should proceed through the following steps:

1. First, the objectives of the basic academic core must be fully specified. Then, the instructional content necessary to attain each objective must be stated. Similarly, the cognitive, personal, and social skill objectives must be specified as well as the content necessary for their attainment.

2. Second, each candidate job must be analyzed to determine the content and experience to which a person is exposed in learning the job and the content and experiences he would encounter in performing it. Both job training and job performance must be examined since their respective content may differ somewhat. For example, experiences in the cognitive domain may be more prevalent during the learning of a job whereas experiences in the personal and social domains may be more significant during job performance. To identify all goal requirements

which can be met in a particular training-performance sequence, both aspects of individual jobs must be examined.

3. Third, content for attaining core educational objectives and cognitive, personal and social skill objectives should be compared to the content to which students will be exposed in learning and performing each candidate job. Where communalities exist the achievement of educational objectives is provided for during the job training-performance sequence and does not require a supplemental instructional process. Those educational objectives not congruent with training and performance requirements must be provided for. A number of alternatives will exist. Needed instruction may be provided for within a more traditional context, it may be self-pursued, or it may be introduced into the job learning-performance sequence.

D. Goal 3 - Development of Minimal Marketable Skill
Goal 5 - Cognitive, Personal and Social Skills Competence
Concept 3 - Performance Based Instruction

A major characteristic of EBCE is the heavy emphasis given to skill development. Skill refers to a rather heterogeneous grouping of abilities. These abilities are inferred on the basis of behaviors that are not completely mediated by knowledge or verbalization of a to-be-performed act. Thus, skill is usually thought of as representing the difference between knowing what to do and being able to do it. The acquisition of skill, unlike the acquisition of knowledge, requires practice or rehearsal. Indeed, the need for practice in its development can be considered the major definitional characteristic of a skill.

A related and common characteristic of skill is that skilled behavior is typically not completely specifiable by verbal means. For

example, a person cannot be told by verbal instruction how to recognize subtle shadings of pitch in auditory tones or in a spoken language or how to hit a baseball. These behaviors can be demonstrated but cannot be completely reduced to verbal description largely because the mechanisms underlying them are internal and non-verbal (auditory processes in the case of discriminating tones, kinesthetic processes in swinging a bat) and language generally does not provide commonly agreed upon verbal labels for describing such processes.

Four skills basic to most human endeavor may be identified: perceptual skill, motor skill, cognitive skill and social skill. (While for some purposes it may be useful to distinguish additional varieties of skill, e.g., artistic skill, these four classes cover the critical varieties of skill found in most jobs and avocations.)

Perceptual Skills - These skills involve the ability to discriminate, interpret, and organize sensory information. Examples are the recognition and interpretation of various forms of vegetation in aerial photographs or the interpretation and organization of signals delivered in International Morse Code. The development of perceptual skills such as those involved in photo interpretation require practice during which a person learns to discriminate varieties and combinations of subtle visual cues. Also, with practice, the identification process undergoes a shortcutting or dropping out of verbal self-instruction or cue naming which initially aids in mediating performance. The learning of Morse Code also demonstrates another common feature of skill acquisition. With practice, the learner organizes the incoming signals

into larger and larger groupings or hierarchies. Initially he attends to signals which denote letters. Subsequently, he attends to and "hears" a longer sequence of signals which signify words and ultimately phrases.

Motor Skills - These skills involve the ability to make an appropriate physical response; for example, shifting from neutral in an automobile in which the simultaneous letting out of the clutch and depression of the accelerator are coordinated. During the development of motor skills a variety of typical processes may occur: (1) the coordination and timing of several simultaneous and/or sequential movements; (2) the connection and smoothing of responses into a rhythmic sequence; (3) the combination and linking of a series of initially discrete responses and adjustments. The development of motor skill often requires learning to make rapid, precise, and, as in the case of many perceptual skills, automatic responses.

Cognitive Skills - These skills involve those covert mental processes associated with the development of concepts or rules, understanding the implications of relationships, and applying rules and principles in making decisions and solving problems. When cognitive behavior is examined, we find the acts or processes themselves virtually impossible to describe.

Because cognitive processes cannot be adequately described or reduced to statements of how cognitive acts are to be carried out, training to develop cognitive skill is inevitable reduced to a series of demonstrations whereby a learner is exposed to examples of problems and given practice in dealing with them. In this sense the development

of cognitive skill is not dissimilar to the development of other varieties of skill.

Social Skills - These skills involve the ability to work successfully with individuals and groups of people. Social skills refer to any variety of interpersonal behavior that is necessary to accomplish a specific objective in a vocational or avocational situation. While social skills may come into play in any situation involving two or more persons, those skills associated with effective response to supervision and effective group performance are of particular importance.

In general, social skill requires problem solving ability. The nature of specific personal and situational characteristics must be identified and related to general principles of social interaction before an appropriate response can be made. Such ability, like the development of cognitive skill in general, is only acquired through practice in specific situations. Furthermore, acquisition of interpersonal skill probably occurs in very small increments since problem situations do not completely repeat themselves and because feedback on the efficacy of a solution is, at best, imperfect. Thus, more practice is probably required for the development of interpersonal skill than for any of the preceding varieties of skill.

The acquistion of social skill encompasses the learning of many different things. Persons learn certain general requirements to be observed in dealing with people. For example, individuals must be shown tolerance and respect. One must be sensitive to the feelings and needs of co-workers, superiors, and subordinates. Some persons have strong

needs to achieve, to be liked, to be dependent upon or dominate others; some are aggressive while others are shy and retiring, etc. Social skill is dependent upon a person's ability to recognize and accomodate to such needs in others. Persons learn to give and take criticism and direction. They learn to role play or see things from another person's point of view and to overcome strong personal dispositions.

Persons learn to exert a degree of balance or focus in adjusting their behavior in response to these needs in accordance with specific requirements and characteristics of the work situation. In a job, decisions must be made regarding the extent to which a co-worker's personal needs should influence behavior and the extent to which the need to accomplish specific tasks or ends should influence behavior. Also, actions will vary according to the structure of the social situation. Where one is interacting with a single individual, greater emphasis may be given to accomodating to his particular style of behavior. Where a group of persons is involved, other considerations may assume greater importance. One must develop the ability to see the informal structure of a group and to perceive social reality in an undistorted fashion. A new person entering a group, whether he is a supervisor or another worker, needs to recognize the natural leader of the group, existing friendship patterns, and group norms. Problems typically arise when such features are not recognized and one attempts to respond solely to the formal characteristics of a group.

A person learns what to observe or look for in interpersonal behavior and how to interpret it. Since the spoken work can often not

be taken at face value, one learns to interpret more subtle actions, intonations, and modes of expression. One learns to sense or see through biased or distorted information and to anticipate signs of interpersonal conflict as it may be revealed in such symptoms as tardiness, avoidance behavior, and critical comments.

As indicated above, practice as opposed to the sheer acquisition of information, is crucial for the development of social skill. Learning how others respond and how one should act with others in order to produce certain desired behavior in them can only be accomplished through rather extended exposure to interpersonal situations and problems. Like other skills, social skill can only be demonstrated and assessed through performance in interpersonal situations.

E. Summary of Interactive Implications of Goals and Organizing Concepts

The interactive effects of goals and concepts have the following major implications:

1. Content.

(a) Job content should be given priority over basic educational content.

(b) Information about jobs and developing competence in jobs should proceed from limited coverage of a range of jobs to intensive learning in a few jobs.

(c) Insofar as possible, content for attaining core educational objectives and cognitive, personal, and social competence objectives should be identified in the job training-performance sequence.

(d) Skill development must proceed from identified content which logically imposes requirements for performance and practice.

2. Instructional Methods, Media, and Strategies.

(a) A student's early experiences in the instructional system should capitalize upon settings which are functionally relevant to the student, i.e., early experiences should occur in a job setting.

(b) The characteristics of a marketable job skill should be specified in behavioral terms so that not only the teacher, but more importantly the student, is aware of his progressive achievements.

(c) Insofar as possible, instruction in the basic educational core and in the cognitive, personal, and social domains should be provided for in the job training-performance sequence.

(d) Performance and practice are mandatory in the development of skill. Where the operations involved are difficult to describe or where they involve interaction with other persons, practice ideally occurs in a real-life situation.

3. Implementation and Management.

(a) Implementation of the instructional system requires that teachers be oriented to the priority to be given to job experiences and the development of job competence.

(b) Teachers and other staff must insure that educational content and experiences guarantee success and the student's recognition of it.

(c) In implementation of the instructional system an analysis of the extent to which jobs can provide a basis for instruction

in a basic core education and in the cognitive, personal and social domains must be accomplished prior to the implementation of an operational program.

(d) Teachers and other staff must exert a quality control function in skill development. They must insure that appropriate and sufficient opportunity for practice occurs to guarantee that skill is attainable.

Chapter 2

INSTRUCTIONAL MODEL: INTENDED OUTCOMES AND CONTENT

Eugene Michaels

I. A NECESSARY PERSPECTIVE

Rather than leap directly into the question of goals, outcomes, or purposes--whatever word best describes the concept that an instructional system should have defined reasons for its existence--we will halt briefly and take a look at who has traditionally defined the outcomes of education.* It is not too much of a generalization to say that all educational goals are derived from the parent society. It establishes the length and content of formal education, the priorities of the educational system and the people who are to be educated.

It is possible to isolate three possible sources of educational priorities in the American social system. We have established *political entities*, such as school boards, Boards of Regents, Trustees and State Departments of Education, to regulate and decide questions concerning curriculum, attendance and priorities.

Colleges and universities play an exceedingly important role of defining the curriculum and structure of elementary and high school education. They are able to exert this influence through the mechanism of entry requirements and admission standards.

Theoretically, *students* may also be a source of educational priorities. If this were the case, students would express needs and desires

*We will use the words, goals, and outcomes interchangeably.

and the educational system would respond and define itself around the wishes of students.

The shape of American education has been defined primarily through the interlocking network of political entities, working in conjunction with universities and colleges. These groups determine what should be learned, when it should be learned and how it should be learned. A necessary consequence of this regulation is that the role of the student must be passive. Things are prescribed for him to learn. Before we center our attention on the student's role in defining educational priorities and goals, we need to look at the model of education, emerging from the traditional mechanisms of setting educational goals.

Social Priorities as Source of Educational Goals

What our society expects of education has often taken the form of resounding goals, stated by national committees, the departments of education, and academic groups. Regard, for instance:

The basic goals of our educational system are: "to foster individual fulfillment and to nuture the free, rational and responsible men and women without whom our society cannot endure." (6, p. 100).

"The purpose which runs through and strengthens all other educational purposes--the common thread of education--is the development of the ability to think. This is the central purpose to which the school must be oriented if it is to accomplish its traditional tasks or those newly accentuated by recent changes in the world." (5, pp. 11-12).

"General Educational Objectives:

a. A general education as good or better than that offered in the past, with increased emphasis on the physical and social sciences.

b. Programs designed to develop patriotism and good citizenship.

c. Programs designed to foster moral, ethical, and spiritual values.

d. Vocational education tailored to the abilities of each pupil and to the needs of the community and nation." (4, p. 3).

The context of these well-meaning statements is, of course, the well-being of the nation. As the *"Sputnik"* crisis led to the stress in the 1950's on a science curriculum, these priorities are also meant to influence innovation in our educational system. The difficulty is in translating these goals into an actual curriculum, for we try to innovate within the present structure of educational institutions. The structure and organization remain the same; the curriculum shifts to accept these new priorities. The institution recasts the innovation into familiar symbols. Rather than changing the structure to accommodate to the new goals, we often dilute the innovation, so that it can be accommodated within the present structure. The end-result is a continuing cycle of rendering innovations meaningless.

On the other hand, these goals serve as a vital source of educational priorities, resulting from our desire for social amelioration, under such programs as ending illiteracy, helping the handicapped to gain work, and building our technical and scientific competence. Education serves as one of the means our society uses to realize these agendas.

It is when we confront these social concerns with the traditional model of education that the goals resound like "hollow brass." While they are stated in terms of personal and social responsibilities, and the qualities of free men and a democratic society, the educational means to these ends are controlled by subject matter disciplines and

their distinctive structures, which were developed quite apart from men acting within a social context.

The Traditional Model of Education

The most prevalent model of education has been structured on a general body of subject matter which every student must sequentially master (9). Thus, the system tries to ensure that all students have at hand the same important facts, principles and ways of reacting to their environment. Students are required to complete units of instruction in history, geography, English, mathematics, under a vertical grade structure. Subject matter is "divided into manageable chunks, each to be covered in a year's time; this content was taught to teachers who were to teach it to children; and content 'was packaged' between the covers of books." (7, p. 213-4).

Under this model, social priorities are translated into subject matter requirements. The student has been placed into a highly subordinant role. If the long-range goal, imposed by the social system, has been translated into a requirement to learn certain chunks of information, the educational system must require

> "teaching a hierarchy of prerequisite objectives to those lacking the prerequisites. In such cases, the prerequisite objective should not be labeled as one formulated by the learners. Similarly, taking account of learner characteristics to plan and organize instruction more effectively toward an imposed curriculum cannot be called self-determining." (8, p. 302).

The distinction is crucial: If the dominant referent of the curriculum is subject matter to be learned, the student can only be

characterized as a dependent variable in the equation. His needs, desires, and individual goals are irrelevant. His ability to learn, his previous attainments, his motivation, his genetic inheritance become the chief concerns. In short, the student becomes a psychological and sociological variable, important only in the sense of learning rate, aptitude, development point, and socioeconomic status.

Traditional systems of education have seldom used the student as the dominant referent, where his desires determine the goals of the system. A few educational programs, confined to the fringe of American education, have experimented with this alternative. While there have been philosophic statements, such as Dewey's progressive education, in general circulation, they have not been the basis of any large-scale educational system. Since there are only limited examples, it is difficult to generalize as to how feasible a program with a large number of students would be. We lack the knowledge base to answer such elementary questions as: At what age should students have a clear idea what their needs and interests are? Is that even a requirement? To what subject matter and what aspects of the educational program should the student have control?

The instructional system proposed for career education has included the concept of a student-directed curriculum. As we have seen, this concept is in direct opposition to the premises of traditional education.

II. THE ORGANIZING CONCEPTS OF THE EBCE

The options permitted in devising employer-based career education (EBCE) have been limited by a set of goals and concepts which are to

govern the design of the instructional system proposed by each consortium. The system must provide "comprehensive career education," with three sets of goals. The system must prepare a student qualified to enter the job market. The student must also be free to pursue his own interests in the arts, humanities, and recreation. And the system must aid the student to attain a satisfactory level in the skills of reading, writing, quantitative reasoning, problem-solving and decision-making.

There should be no doubt that to create an instructional system which would successfully realize all three sets of goals is a formidable undertaking. But these general goals should be considered not as prescriptions, but as general guidance as to what might be attempted within the EBCE system.

It is not our purpose to define for any consortium a set of priorities or to design an instructional system. Defining priorities is a function of the decision processes that any one consortium must make for itself. The set of goals should serve as guidance from the sponsoring agency as to what ideals the consortium should try to attain.

Options are also limited by the organizing principles that the sponsoring agency requires in the design of the instructional system. All the organizing principles are explored in depth within Chapter 1. They influence both the overall goals which are to guide the consortium and its decision-making procedures.

The organizing principle of a *student-centered curriculum* exerts the most direct influence on this chapter. Under this principle, students are guaranteed certain rights:

The right to enter and leave the instructional system at their discretion.

The right to choose educational goals.

The right to change their minds and pursue other educational goals.

The implications of these freedoms as they relate to the design of the EBCE system will be examined later. Immediately, the role of the student as a decision-maker and formulator of educational goals has direct bearing on the structure of the EBCE system. What will be the student's voice? At what time in the decision-making process? What are the options he will have or not have?

III. THE PREMISES OF A STUDENT-CENTERED INSTRUCTIONAL SYSTEM

The primary supposition of this chapter is that students will have total voice in choosing their own educational goals. Later, we shall try to build the design components necessary for student choice of educational goals. (The components will be arranged in a series of problematic steps the consortium should make, if it is to seriously pursue the design of a student-centered system.) At first, we will spell out the four theoretical premises of a *student-centered instructional system*. The four premises are:

1. *The curriculum must be defined by the educational goals of the students.* Since a curriculum must have a purpose, its purpose must be to offer students the learning experiences which will lead them to the end-states they desire. The end-states should form the structure of the system.

The end-states the student will desire can possibly be grouped into four broad domains:

a. occupational, skills and competencies necessary for entry into job market,

b. cognitive, the skills of language, quantitative reasoning, problem-solving and decision-making,

c. personal, experiences in the arts, humanities, recreation, and

d. social, experiences interacting in groups and other social settings.

There is of course overlap among these domains and they do not constitute discrete entities.

2. *If students are to establish the goals of the curriculum, the consortium must be prepared to offer learning experiences in all four domains, or in any combination of the four.* Some students may not want to pursue any occupational goals; others may want to pursue a single set of occupational goals to the exclusion of all others. Others may want to receive cross-training in a broad range of occupations, which will qualify them for many jobs. Still others may choose entry to a junior, community or four-year college as their educational goal. The consortium must establish as a consequence of students defining goals a highly flexible and open-ended curriculum.

3. *The consortium must also be prepared to allow multilevels of student involvement.* Educational goals can be divided into long-range and short-term involvements. For example, cognitive skills might belong to continuing concern of the student where he develops these skills to

the level he chooses or to a level necessary for entry to higher education. Cognitive skill development may also be short-term, in the sense that the skills would be job-focused, i.e., the student would attain the level necessary for entry into a specific job. Another example: Career-development might also be structured as a long-term goal. Students, rather than acquiring specific skills based on the requirements of a particular job, would have general competencies in a broad span of possible careers.

Not only must the student have the choice as to what goals he pursues under a student-centered curriculum, but also to what level of involvement he chooses, under a short-term or long-range arrangement, or any combination of both.

4. *The consortium must also provide the opportunity to the students to explore various educational goals and purposes.* Some students no doubt will have a clear idea of what goals they would want to pursue. There is a strong probability that other students will need to have the time for exploration, in order to acquire information and make decisions about what they want to do.

The situation where the student lacks goals or wants to change them presents the necessity for establishing a mechanism where the student without compulsion can evolve a stable purpose. To put the case as simply as possible, the system needs to offer the student a chance to explore. However the exploration might be structured, students will need information about themselves, and about probable career roles they might want to achieve. Since goals belong exclusively to four domains, exploration must include opportunities for social, personal, cognitive and occupational experience and self-appraisal.

IV. DESIGNING A STUDENT-CENTERED INSTRUCTIONAL SYSTEM: PHASE 1 OF INSTRUCTIONAL DESIGN

The essential first step is to prepare an overall statement of the educational goals of the instructional system. Under the premise of student-centered instructional system, the educational goals are to be decided by the students themselves.

As the first step, the consortium needs statements of educational goals that students would want to pursue within the EBCE. Statements such as, "learn to be a typist," "enter a college," "learn to sing," "care for children," "I just want a good-paying job," "to play baseball." One of the ways these statements may be gained would be to survey the desires of all the students in the community, including drop-outs, those who have finished high school and those who do not have jobs. Another way would be to schedule in-depth interviews with cross-sections of each group of students in the community. Another way is to set up discussion sessions with groups of students to examine educational goals they would accept. Through these means, statements of goals can be gathered from students, representing an inclusive sample of the range of educational goals within the community.

As a second step, the consortium needs to devise a way of placing the goals within broad domains to form a matrix, thus categorizing usefully the goals. The main requirement of such a matrix would be that it can distinguish anong all possible goals, and place them into discrete categories. One possible matrix would segregate the goals into four domains: the occupation, the cognitive, the personal and the social.

Under the occupational domain might fit all goals which are directed toward attainment of employment, whether it be a forest ranger; dress

designer, stenographer, automechanic. Under the cognitive domain would be included all goals which are directed solely toward attainment of process skills, such as reading, arithmetic, writing, instruction within the sciences and humanities, and those which satisfy college or university entry requirements. The personal domain might include learning how to sew, paint, play a guitar, sing, or work in crafts; while in the social domain there might be goals such as acting in a play, engaging in sports, or playing in a band.

These domains might further be dichotomized into long-range and short-term involvements, where the students on one hand see their goals as a central involvement over a period of years and on the other as a brief or shifting involvement. The matrix would be:

	long-term	short-term
occupational		
cognitive		
personal		
social		

The cells of the matrix would have, for example:

within cognitive, long-term - entry into a college or university

within cognitive, short-term - improving my spelling

within occupational, short-term - learning to type

within occupational, long-term - being a doctor

within personal, short-term - learning to play a guitar

within personal, long-term - learning how to fly-cast

within social, long-term - getting involved in politics

within social, short-term - forming a committee to plant trees.

Because goals may be extremely heterogeneous, any matrix might be unable to separate goals into discrete categories. The dimension that this particular matrix stresses is the students' sense of purpose. Learning to play a guitar might result in a career in music for one student; for another it might be a leisure activity.

The matrix at a later stage in the design of a curriculum might be further divided into further sub-categories, based on the learning requirements of the long-range or short-term goal. Entry into a college or university has specific requirements, which the student has to fulfill. Learning to be a secretary has certain learning requirements, such as typing, stenography and filing on which to design a specific curriculum. At any early stage in the design of the system, a matrix like the one outlined above should be used to gain some idea of the possible range of outcomes that the instructional program must deal with.

Although a survey of student goals might be a time-consuming and expensive process, it has the crucial merit of identifying empirically the educational goals of the students in a community. It can identify the percentage which has clear goals in mind in each domain and the percentage which has little or no sense of purpose.

From the goals of students in various sub-populations--those who have dropped out and are unemployed, those who want to enter college--the consortium will have an important planning vehicle to prepare specific instructional programs. The consortium might discover that a large percentage of students have in mind some sort of ill-defined job preparation. These students would need the chance to explore various

occupations, find out what is required in each, and what they as individuals must learn to attain entry. If this were the case, the consortium would now have one main focus for the instructional system, the necessity of preparing a set of exploration experiences in jobs.

SUMMARY

A student-centered instructional system must be based on the goals chosen by students. A survey has been recommended as the primary means of finding out the range of goals in a community.

Secondly, it was recommended that once the information was collected, a matrix be used to order the goals into various domains, so that the consortium arrives at the probable main focuses of the instructional program. Whatever the specific format of the matrix, it should be based exclusively on the goals of the students, not on the resources of the consortium or any administrative concern.

The initial phase of instructional design should include these concerns:

PHASE 1

GOAL DEFINITION *The determination and specification of the educational goal universe. Students state their educational needs and desires.*

ACTIVITIES 1. Collection of demographic data on target population--13 to 20 year olds. Identification of sub-populations with main student population of a community. For example:

a. number presently in school within each age group,

b. number who have dropped out from school,

c. number who are unemployed and have finished school,

d. number who are drop-outs and unemployed.

2. Preparation and administration of survey instruments to collect statements of goals of the target population. For example, the instruments might include:

   a. open-ended questionnaires for each sub-population identified on goals,

   b. in-depth interviews with representatives from each sub-population,

   c. closed-list questionnaires where the students in each population establish priorities among goals,

   d. group discussions with students about educational goals.

3. Arrangements of goals gathered from students, i,e., the goal universe into goal domains. Requirements for cohering goals into domains:

   a. include all possible goals,

   b. does not impose any artificial categories on the goals, such as "miscellany,"

   c. is based on perceived purposes or desired outcomes of the students,

   d. is not based on the learning requirements of the goals,

   e. is not based on the resources or needs of the consortium.

HAZARD — Students may not have clear sets of goals in mind, requiring consortium to have as one main focus "exploratory instruction" for sizeable part of a student population.

OUTCOME — An ordered set of probable educational goals which the instructional system would have to satisfy. The ordered set derives from a matrix which coheres goals into various domains.

V. THE RELATIONSHIP OF GOALS AND CONSTRAINTS: PHASE 2 OF INSTRUCTIONAL DESIGN

At an early state in the planning, the goals of the students have to confront the limits of the real world. What money, staff, time,

administrative support will the consortium have to make available to meet the instructional demands created by goals? A useful way to relate goals to constraints is to establish "families" of feasibility.

The first family groups the resources immediately available to the consortium on which to build an instructional system. The second groups the additional resources which must be made available if the total set of goals are to be met. The third isolates whatever goals cannot be met by the consortium. (A consortium in an urban location might have difficulty in preparing students to be farmers or forest rangers.)

The obvious purpose in arranging the constraints into groups of feasibility is to determine what is most feasible for the consortium to attempt with its present resources, what is feasible if additional resources are gathered, and what is totally unfeasible. More importantly, the options are sorted out after the educational goals have been defined. In a strong sense the goals and the resources available are highly interactive, but the correct priority has been established--goals first, then resources.

As the consortium considers its resources and sees what impact they have on the goals, it needs to begin to isolate the allied functions which are to support the instructional system. The following functions are only a tentative list.

A student information function would have the responsibility of explaining to those entering the nature and purpose of the instructional system, the scope of offerings in each domain and the types of offerings from which the student can meld his own instructional program.

A second allied function would have the role of student assessment. Entering students need information about how they stand in terms of prior knowledge, interests, capabilities to the goals they might choose to pursue. They need information about themselves as individuals, so that they can see the nature and extent of instruction they must undertake to realize their goals.

When the instructional system becomes operational, a communication network should be established with those students who want to redefine their educational goals and who are having problems of one sort or another. This communication network defines a third requisite function, that of student counseling.

Finally, a fourth function can be isolated, student placement. As the students leave the instructional system, there should be some means of facilitating entry into various occupations, apprenticeship programs, higher education, technical schools and, if necessary, re-entry to the instructional system itself.

Not only resources limit the scope of the instructional system but a whole network of political and institutional control. In its specific locale each consortium should begin to array what limitations are placed upon any educational institution by state and local laws. Colleges and universities also have imposed minimal educational requirements for entry. Businesses, industries and unions also have standards for job entry. The implications of these controls and standards should surface at this early planning stage. And some answers should be tentatively given to these questions: For what ages is school attendance compulsory? Do safety requirements limit the extent of possible work experience for minors?

If diplomas are not to be awarded, are the students to get certificates of achievement which show various occupational competencies? Can some formula be arrived at which will convert the instruction offered to students into standard academic credits? Probably all such questions seem to constitute an administrative nightmare at first glance. But these questions, once structured into a planning blueprint, are attackable in the same ways that businesses and industries collect information, plan options, and operate within the spheres of federal and local regulation of their activities.

SUMMARY

PHASE 2

CONSTRAINT DEFINITION — *The limits imposed by available resources which the consortium is to use to meet the educational goals of the students.*

ACTIVITIES

1. Sorting of constraints into families of feasibility:
   a. Money, time, physical resources, staff available to meet educational goals. From this determination should arise the educational goals which the consortium can easily meet and those which are most difficult to meet.
   b. Money, time, resources and staff additionally required to meet all educational goals. From this determination should arise the total complex of goals practicable and feasible for the consortium to realize.
   c. Isolation of educational goals impossible for the consortium to realize.
2. Sorting out of requirements which govern educational enterprises in a specific locale:
   a. Laws and regulations which control educational institutions and participation of minors in industrial and business enterprises.

b. Entry requirements imposed by colleges and universities.

c. Entry requirements imposed by businesses, industries, and unions.

3. Isolation of allied information and communication functions, supporting the instructional system.

a. Information to entering students about themselves and the nature of the instructional program (student assessment and student information functions).

b. Communication with students during involvement in the instructional system (student counseling function).

c. Help and information to students leaving the instructional system (student placement function).

HAZARD — At this stage in the planning, the consortium should establish task forces which will start to organize these activities. The activities themselves should be thought of as continuing throughout the design of the curriculum. They are not activities with an abrupt end. As the curriculum becomes more and more specific, other questions in these areas will arise which will need consideration. We are only recommending that some mechanisms be established very early which can handle these activities.

OUTCOME

1. Establishment of mechanisms which will array the restraints placed on the consortium by time, money, staff, other physical resources, laws, and regulations, in realizing the total complex of probable educational goals of the students in a community.

2. Establishment of mechanisms which will array student information and communication needs as they proceed through the instructional system.

VI. TRANSLATING THE GOALS INTO THE CONTENT OF A STUDENT-CENTERED INSTRUCTIONAL SYSTEM: PHASE 3 OF INSTRUCTIONAL DESIGN

INTRODUCTION

We are now at another major sequence of activities, calling for the translating of goals into specific content, and thereby determining the

learning experiences the student should have. The term, content, is used to mean the skills and knowledges the student is to acquire. Thus the consortium has arrived at the content of the instructional system, when it provides the learning steps, taking the students to where they want to go. By this definition we are stipulating that the learning steps be derived from the educational goals and that they not be confused with the processes of instruction.

The processes of instruction describe how the learning experiences and activities should be conveyed to the student. (They are the topic of Chapter 3.) If the goal of the student is to learn French, for example, we need to define first the prerequisite steps such as acquiring vocabulary, learning idiomatic expressions and rules of pronunciation the student must undergo to learn French. How the content will be conveyed is decided secondly, whether it is through a teacher, a computer terminal, a film, or audiotape in a language laboratory, or some combination of these.

In the sections prior to this one, we presented procedures by which the consortium might survey the goals of the students, in order to know what ends the students will use the instructional system for. We presented a matrix which could order the heterogeneous assortment of goals into possible domains. We also described the need for a feasibility analysis, so that the goals were weighed in terms of resources available. In order to show how content is to be derived from goals, we will use the matrix of goal domains as the beginning point.

The matrix ordered goals into four domains: occupational, cognitive, social, and personal. The domains were subdivided into long-term and

short-term outcomes, dependent upon the purposes of students. If their interests were profound and they saw the goal as their life's work or interest, then the goal was long-term. If their interests were immediate, with no implication of continuing involvement, then the goal was short-term.

Organizing Centers of the Instructional System

The long-term goals of the students can be used for the organizing centers of learning activities and experiences. The organizing centers provide an intermediate level of structure on which to build the content of the instructional system.

Many of the goals will be beyond the scope of the instructional system because they would require an intensive period of schooling--goals of students who want to be chemists, biologists, doctors, lawyers, professional concert musicians, teachers. The instructional system, however, can translate these goals into ones which are within its scope. Thus, one organizing center of instruction would be the content necessary for college or university entry. By using organizing centers in this way, the consortium can translate a larger number of disparate long-range goals into common learning requirements.

Other long-term goals will be with the scope of the instructional system, because they do not require an intensive period of schooling for entry. This is especially true of occupations such as secretaries, carpenters, plumbers, mechanics. Organizing centers can be built from occupations that have common skills. By clustering these skills, the

consortium will have created organizing centers for instruction of groups of students, although they have differing goals.

Another organizing center for instruction can be built around those students who don't know what they want to do. They need to gain information about various careers and fields of study, need to explore various occupations, and need to assess their talents, needs, and interests in relation to various educational options they may select. Their organizing center would be exploration. Their common content would introduce them to various occupations, permit them to sample various options and pursue short-term interest, until they found a center for their education.

The major problem that the organizing centers try to solve is how to devise general content structures that can handle large numbers of students with a large number of different goals. Taking long-term goals as the beginning point, we suggested that organizing centers can be created from them to prepare general pathways of instruction that can group large numbers of students with diverse goals. Secondly, we suggested that the pathways used to prepare students with precise long-term goals can be used additionally as exploratory content for those students without a clear focus to their education.

Organizing Centers and Personal and Social Goals

The second problem is how to structure the content which is based on the purely personal and social goals of the students. The consortium can derive part of the content of the instructional system from the demands that higher education, businesses, industries, state, local and federal governments placed on entry into jobs and professions. Students

who have chosen entry to a job or profession will have to meet these requirements. But the personal and social interests of the students cannot be derived and structured in this way. This part of the instructional system can only have a structure that each individual imposes on it. It can only give students sufficient space to explore themselves in various activities and experiences, without regulation, to ends that perhaps have no meaning except to themselves.

As the content is outlined for both college and occupational entry and the pathways devised to take the students to that point, the same content may be used partially for short-term personal and social interests. Content devised to take students to certain long-term outcomes can additionally be used by students to explore various occupations, in order to arrive at a focus for their education. It may also be used by students to pursue short term social and personal interests. Some concrete illustrations may make this point clearer. The girl who wants to be a secretary may also want to learn to sew, learn French, and play tennis. Part of her learning content is the same as for a student who wants to go to college and who must meet a foreign language requirement. The boy who wants to be a carpenter may also want to learn about biology. Part of his content is the same as a boy who wants to go to the state university. The student preparing for college may want to learn typing and carpentry. Again, part of his content is the same as the girl who wants to be a secretary and the same as the boy who wants to be a carpenter. Thus the same content may be used for differing purposes: to prepare someone for a vocation, as a leisure or recreational activity, or as a sample from which to choose a career.

SUMMARY

PHASE 3

CONTENT STRUCTURE DEFINITION — *Translation of overall goals into specific content determining the skills and knowledges which must be acquired to reach the end-states or goals desired as a result of instruction.*

ACTIVITIES

1. Using the matrix of the four goal domains, select the long-term goals that need to be translated into educational outcomes that the consoritum can realize. From this translation the consortium should have developed one organizing center of instruction: preparation for entry into higher education. The content structure for this grouping of students will derive from the entry requirements of colleges and universities:

    a. Array the entry requirements that colleges and universities place on entrants.

2. Using the matrix, select the long-term goals that the instructional system can fully realize within its instructional system. (Many of these will be occupational goals.)

    a. Delineate the skills and knowledges that are required for entry invo various occupations or families of occupations.

    b. Isolate the skills and knowledges that are generic to a number of different occupations.

    c. From this analysis should result organizing centers which provide a means of grouping students with diverse goals into general pathways of instruction.

3. Prepare exploratory content, based on the above organizing centers, which will permit students without long-term goals to sample among occupations and fields of study. This will lead to the third organizing center: the exploratory curriculum.

4. Prepare content for realization of personal and social goals of the students:

a. Select content from the above organizing centers which can be used also for the short-term personal interests of the students.

b. Other content will arise from the survey of educational goals done in Phase I. The feasibility analysis of Phase II will give the consortium an indication of what content the consortium can offer in these domains.

c. The consortium should arrive at the final menu of choices it can economically offer to the students, establishing the minimal and maximal number of students needed for offering the options, and establishing the degree of options that each student can have.

HAZARDS

1. The skills, knowledges, and the content of the instruction should be derived from the educational goals of the students.

2. The content should be stated, independent of the methods or media by which the content will be conveyed.

3. The analysis of the educational demands for entry into higher education and into various occupational roles should be based on the concrete and discrete knowledges and skills that define the entry requirements. For example, if a girl wants to be a secretary, the skills and knowledges she needs are those which will permit her to enter the door of a personnel office in response to an advertisement for a secretary, not someone's preconception of what an ideal secretary is.

OUTCOME

1. Organizing centers which will permit the consortium to structure diverse goal requirements into various general pathways of instruction.

2. Final content menu that the consortium can offer to students to fulfill their personal and social short-term goals.

VII. TRANSLATING OF CONTENT INTO INSTRUCTIONAL OBJECTIVES: PHASE 4 OF INSTRUCTIONAL DESIGN

The final question dealing with the content of the curriculum is how the content should be stated. In what format should the skills and knowledges be communicated to the students?

One approach might be to state the content in terms of what the teacher is to say or the textbook to include. For example: The Functions of the Nail in Carpentry; the English Romantic Poets; the Conservation of Matter. In each of these instances, we know what the lecture or the textbook chapter is to cover. But we do not know what the student is expected to learn or to be able to do. Learning is a change in an individual's capabilities; the purpose of instruction is to bring about desired changes in the individual's capabilities. The approach of stating content by referring to what the teacher is to do or what subject matter is to be covered is unsatisfactory to this description of learning. It does not refer to any change expected in the student or describe the capability he is to acquire.

A more useful approach would be to require statements of content, describing what the student should accomplish as a result of instruction or exposure to a learning experience.

The translation of content into specific learning outcomes is important for several reasons:

1. When the content is specified in this way, it centers instruction on the student, not on the subject-matter or role of the teacher.

2. It directs the design of instruction toward an assessment of what prior capabilities the student must have to benefit from the instruction.

If the student cannot add numbers, a unit on subtraction would not be useful to him until he had the ability to add.

3. If statements of objectives are instructor or subject-matter centered, it is impossible to assess what the learner has gained from a unit or period of instruction.

If the purpose of an instructional unit is to teach students to read settings on a micrometer, it is relatively simple to devise a test which samples the student's ability to read settings on a micrometer. If the statement of content reads, "The Use of the Micrometer in American Industry," what should be what should be assessed, or even taught, is unclear.

4. It tells the student what he exactly must learn in a unit of instruction, thus giving him a focus where he can direct his attention and efforts.

The Limits of Objectives

A few examples might illustrate how the content can be translated into instructional objectives, and some of their limitations. A girl at sixteen enters the instructional system desiring to be a secretary. From the analysis of the skills necessary to be a secretary, we have learned that she must have training in four areas: filing, typing, shorthand and answering the telephone. Each area must be translated into what she is expected to be able to do once she has had learning experiences in it. Secondly, we must know whether she has the pre-requisite abilities to be able to enter instruction in each area. In filing, does she know the order of the alphabet? Can she read at the prerequisite level of ability that learning to file calls for?

In this instance, the girl has chosen goals which are directly translatable into objectives. She can use the instructional system in a straightforward manner to become a secretary. The objectives work admirably to provide her the training she needs.

Another case might be a boy who enters the instructional system at the age of 13. He is unsure of any long-term goal he might want to attain--whether to go on to a college or to train for a job. He decides he would like to sample some occupations, play baseball, learn biology and French.

What specific outsomes should he have once he has sampled various occupations? While the instructional units have furnished him with information about the occupations, he still may remain undecided. Thus, no instructional objectives can guarantee that he will translate these experiences into a decision about his life. Instruction may help him to decide, by furnishing him with experiences and information and helping him to attain a broader perspective. That is, instruction can realize very specific outcomes for the student on a short-term basis. Whether he translates these experiences into actions or decisions affecting his life cannot be predetermined or enforced.

A boy may enter the instructional system at 16, wanting to be an auto mechanic. He reads at the fifth-grade level; he can just add and subtract whole numbers. Obviously, a large part of instruction must be directed toward improvement in the basic skills of reading and arithmetic, even for him to enter instruction on his chosen interest.

But at what point is his instruction in reading, writing and arithmetic to end? One level of proficiency might be set for these skills

as sufficient to benefit from instruction in auto mechanics. He will have to be able to read materials that a mechanic commonly reads in performance of his job. He will have to make measurements that mechanics often make.

Another level of proficiency that he is to reach in these skills might be an arbitrary minimal one set for all students in the instructional system. For instance, the standards for all students might be: read at the 11th grade level, demonstrate the ability to do simple mathematic operations with whole numbers and fractions, demonstrate the ability to do syllogistic reasoning and frame a hypothesis to investigate a problem.

Instructional Objectives and Levels of Proficiency

Either level of proficiency will seriously affect the basic nature of the instructional system. If the consortium sets different levels of proficiency for individual students, based on the entry requirements into various occupations or higher education, then sharp divisions will result among groups of students. The cognitive level of functioning required for different goals is highly disparate, with different reading levels, for instance, required to benefit from instruction in the sciences or in typing and welding.

On the other hand, if minimal levels are imposed on all students, the question becomes what constitutes a sufficient minimum: a 10th grade reading level, mathematical ability typical of the average 11th grader? Also if minimal levels are imposed, the freedom of students to choose their own goals is seriously circumscribed. The levels of proficiency all students are to reach may have no relation to their particular

goals. Moreover, the instructional time necessary to bring all students to a minimal level will be highly disparate, based on the aptitude and prior learning experiences that students will enter instruction. Some students may have to spend significant amounts of time, possibly several years, to reach the minimal levels established by the consortium.

Probably the judicious use of both types of proficiency levels is necessary. If the cognitive level of functioning is very low, the chief benefit to such a student would not be only in training him with marketable skills but also in bringing him to a minimum level where he can process information for general communication and social interactions. How high a level he should attain, should be based on his aptitude, time to be spent in the instructional system, level he may want to reach, and his educational goals. In short, the criteria should not be applied inflexibly but should arise from a set of factors--prior attainments, aptitude, interests, age at entry, time to be spent in the instructional system.

If there are many students whose cognitive skills are far below the norms established for their age, it might be necessary to build an organizing center to be used as a remedial adjunct to the main content of the curriculum. Students with serious deficiencies in cognitive skills might have to enter this remedial adjunct before they are permitted to enter the main instructional system. They would remain there until they developed their cognitive skills to a level sufficient to begin instruction within the main system. Students whose deficiencies are not as serious might be able to combine the remedial adjunct with limited selection from the main content, which fit some of their educational goals.

Instructional Objectives and Social Goals

Social goals additionally pose problems for the statement of instructional objectives. The main question is: Is it possible to state beforehand what exact outcomes students should acquire after group interactions and experiences in different social and work settings? The students who choose to form a committee to tutor younger students in neighboring grade schools indeed have goals they want to reach. The boy who wants to play baseball probably wants to realize some social goals important to himself.

Are the results of these interactions possible to state in terms of long-term instructional objectives that students should realize? We can state them but whether individual students will attain them cannot be predetermined. All that seems possible is to provide the experiences and activities that students select as important social goals. What changes occur in the personality structure of the individuals and what changes occur in their self-images as a result of them are outside the realm of instructional objectives. The most the consortium can do is to provide the experiences, structure the occasion for students to interact in ways they choose and hope as a result that the experiences will cause them to broaden their perspectives, be affective in group dynamics, learn to interact with different individuals and be socially responsible individuals.

The Implications of Behavioral Objectives

Many implications become apparent in the general rule of stating the content in terms of behaviors desired of the student as a result of instruction:

1. The skills and knowledges to be acquired in the occupational and cognitive domains can be stated as short-term behavioral outcomes that should result after a period of instruction. They can be used to state what the student should acquire to become proficient for entry into occupations and higher education. And they can be used for statements of what cognitive process skills the student should demonstrate.

2. Learning experiences in the social domain can only be construed as facilitating ones. While separate experiences and activities may have defined short-term outcomes, there is no guarantee that these experiences can affect change in the basic personality structure of the individual, in his self-image, or in his relationship to his society.

3. In the personal domain the experiences and activities should be thought of as ones which facilitate the preparation of a system of values. The consortium may direct his activities under short-term instructional activities, once he chooses to involve his time and energy in them. Whether he changes his values, goals and his life style as a result of the experiences cannot be guaranteed by the consortium.

4. The imposition of levels of cognitive proficiency has serious implications on the nature of the instructional system. On one hand, the students must meet certain levels so that he is qualified to enter an occupation or higher education. But these levels may ill-equip a student who wants to pursue avocational interests that require a different level of cognitive functioning or the student who wants to shift his goals at a later stage.

On the other hand, if the consortium adheres exclusively to levels of proficiency it arbitrarily imposes, student freedom to choose goals

becomes limited. The levels of proficiency required of individual students should not be inflexible, but be a judicious mix of a set of factors: prior attainments, aptitude, interests, age at entry, time to be spent in the instructional system, levels chosen by the student, and educational goals.

5. When the objectives are stated in terms of behaviors desired as a result of instruction, the consortium must be concerned with what capabilities the students enter an instructional unit. Does he need this instruction, if he has had similar instruction in the past? Does he have the prior knowledge or skills for him to benefit from this particular instructional unit? To assess the student at entry level, the consortium should assemble tests which determine whether the student should have preparation before he enters, or whether he can bypass this unit because of previous attainments. The tests can be derived from the objectives themselves, to see what learning preconditions are necessary to enter this unit, or to see if the student has beforehand the skill and knowledge repetoire which the unit is to offer.

SUMMARY

PHASE 4

CONTENT STATEMENT DEFINITION — *Translation of content into instructional objectives.*

ACTIVITIES

1. Specify the content of the curriculum in terms of operations which the learner should demonstrate as result of receiving instruction.
2. Establish criterion levels of proficiency the student should demonstrate his skills and knowledges which he has acquired as a result instruction.

3. Prepare the instruments necessary to assess whether the student can demonstrate the skills and knowledges at the criterion level. These instruments can also be used to see if a student can by-pass a unit of instruction because of prior attainments.

4. Prepare the instruments necessary to assess whether a student is ready for entry into an instructional unit, based on the requirements necessary to benefit from a unit of instruction.

HAZARD — While the consortium may try to direct the short-term objectives from units of instruction, there is no guarantee possible that these objectives will be used in the intended ways by the learner.

OUTCOME — Establishment of the instructional objectives of the curriculum in statements of:

a. what the learner must be able to do or demonstrate as a result of instruction;

b. what the learner should be able to enter instruction with;

c. what the level of proficiency is for acceptable demonstration or performance.

VIII. CONCLUSION

The main question that this paper tried to confront is: Can we realize a radical redefinition of education which is open-ended enough to establish student decisions and goals as the main source on which to design an instructional system? The greatest hidden fear in education is that students will choose to do nothing if they are given the freedom of choice. If we operate under such a fear then we are indicting ourselves and our educational system as coercive, because we view the young as purposeless, goal-less and unable to handle the responsibility for their own education.

It is also hard to understand the premise of that fear because we have very little evidence to support the notion that students cannot handle the responsibility of setting their own educational goals. The little evidence we have comes from the context of the present educational institutions, where we have instances of student rejection of the educational mechanisms and student abuse of freedom. It may very well be that students are trained to function in a totalitarian setting which ill equips them to handle individual responsibility for education. It may be that by the institutional arrangements we are handicapping students in the development of the important skills of accepting responsibility for their own education.

The premise of this paper is that it is possible to adapt the concept of an instructional system to permit student goals as the main determinant of the purpose of the instructional system. Whether or not the premise is possible to actualize into a specific instructional system can only be known through an empirical test. Hopefully, we have arrayed the major problems involved in the design of a student-centered system. Even more hopefully we have spelled out some design solutions to the problems.

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Chapter 3

INSTRUCTIONAL MODEL: PROCESSES OF INSTRUCTION

Eugene Michaels

I. INTRODUCTION

In the design of any instructional system there are always three main points of concern. One is the educational goals or the purposes of the instructional system. The second is the student, since he is the one who is to attain the educational goals. The third concern, the topic of this paper, is the processes by which the student is to learn. The processes of instruction provide the occasions for learning to take place.

We need to define at the onset some of the terms that will occur continually throughout the body of the paper. The term, *content of instruction*, refers to the skills and knowledges that the student will acquire in order to attain some goal. The student, for example, who wants to be an x-ray technician has to acquire certain knowledges and skills: human anatomy, developing x-rays, positioning the apparatus correctly, and so on.

The term, *processes of instruction*, refers to the means by which the content will be conveyed to the student. If one of the knowledges necessary to being an x-ray technician is human anatomy, he might acquire that content through a variety of means--a lecture, a programmed text, a computer terminal, or a textbook. The design of the learning experiences and activities of an instructional system is completed when

the content is stated that the student should acquire to reach his goals and when the processes of instruction are decided upon that will convey the content to the student.

Prerequisites for Designing the Processes of Instruction

In order to select and organize the processes of instruction, certain events should take place first:

1. The most crucial event is the statement of the educational goals of the instructional system.

2. The content, the skills and knowledges the student is to acquire, should be derived from the goals of the instructional system. The content, as much as possible, should be stated in terms of behavioral outcomes: What the learner should be able to do upon completion of an instructional unit.

3. The processes of instruction are decided upon only after the content has been stated in the form of behaviors. We must know what capabilities the student is to acquire before it is decided how he is to learn them.

4. The last event concerns the evaluation of the instructional system. Evidence has to be presented that the contents and the processes of instruction will realize the overall goals of the instructional system.

This chapter begins discussion of the third event. It begins in the middle of the design of an instructional system. Therefore, certain outcomes must be accomplished before the means to arrive at the third outcome can begin. We must have defined the goals of the instructional system. We must have derived the content of the

instructional system. We must have stated the content in the form of behavioral objectives. After these events are accomplished, then we have the basis to begin the design of the processes of instruction.

II. ORGANIZING PRINCIPLES AND THE PROCESSES OF INSTRUCTION

The sponsoring agency has developed a set of principles which are to guide the design of the instructional system. Since they have been introduced in Chapter 1 and their relationship to the educational goals discussed in Chapter 2, we will only consider the impact of these principles on the design of the processes of instruction.

SELF-PACED

One of the main variables in learning is the amount of time allowed the student to learn. Under group instruction in the classroom, an arbitrary time limit is imposed on students. Group instruction ignores the fact that students learn at different rates and enter an instructional unit with different abilities and different prior knowledge. Instruction where the student can learn at the rate he chooses or at the rate necessary for him to acquire the material is labeled self-paced instruction.

Self-paced instruction is closely tied to the idea of behavioral objectives. A student can only proceed at his own pace if the instructors know what the learner should be able to do when he finishes the instructional unit and what prior knowledge or skills he must have to begin the unit. To make time to learn a variable, rather than a boundary or limit, the skills and knowledges to be taught need to be behaviorally defined, so that both the student and instructor know

when the student has acquired the objectives of the unit.

Implications of Self-Paced Instruction

1. Awarding Grades.

The concept of self-paced instruction destroys the rationale of grading students. Students are given grades on the basis of skill or knowledge acquisition within a defined time limit. If time to learn is no longer limited, then one of the chief rationales for awarding grades is gone. A student gets an "A" because he has mastered the content of an instructional unit, say, within a week or semester. A student gets a "D" or "F" because he has not gained the content within the time limit. Under the concept of self-paced instruction, the student progresses at the rate he chooses. Neither the student who progresses quickly nor the one who works slowly is rewarded or penalized because he takes more or less time.

The only standard that makes sense under self-paced instruction is mastery. Mastery is the level that all students must attain at the completion of an instructional unit. For the student to know that he has learned the content, there must be some standard against which his performance is measured. If his performance is unsuccessful, it does not serve the student well to assign him a "D" and let him go on.

2. Performance Standards.

What defines successful performance? That is an empirical question and needs to be answered after the instructors have had a chance to explore various options. In skill performance, success might require a smooth and routinized level of ability. In carpentry, for example, the students may have to hammer nails so that few are bent,

with most at the correct angle of placement. In typing, rate of words typed per minute may define the level of mastery the student must reach.

In cognitive performance, the problem of standards is more complex. We cannot observe a student's cognitive operations; we can only observe some product or behavior that is shaped by the cognitive operations. From performance we infer the student has the supposed cognitive ability. Since we can only infer, the conditions or samples that we select in order to infer become extremely important.

The sample should be extensive enough so that we have a good number of problems or tasks on which to decide that the student does or does not have the ability. The sample should represent the specific class of problems or tasks that the student learned to do in the course of instruction. If one of the problems we pose to students after a unit in history is to write an essay, the student should have had experience in writing historical essays during instruction.

There is no easy way to decide beforehand what exact standard of performance should be used. That question is answered only after exploring the options, after the instructor has applied the standard that seems to him the best and most reasonable one for the unit first, then trying it out in a pilot study.

STUDENT-SELECTED PROCESSES OF INSTRUCTION

This organizing principle requires that the student should be able to choose the processes by which he learns. There are many ways information can be presented to the student. A textbook may present it, as well as a film, an audiotape or lecture. If the processes of

instruction are to be selected by the student, then the student will have as many options as possible for the ways in which he learns.

The Range of Learning Options

It is futile to arrange as many discrete processes as theoretically possible, because they may not constitute genuine options. A variety of media may be used to present a lecture--a person, television, film or audiotape. Whatever medium is used, a lecture is still a lecture. To provide a student a choice of media, if the structure of the presentation is always the same, does not offer him real alternatives. Alternatives should be based on differences in the way the content is structured for presentation.

The extent that the content is structured offers a true series of alternatives. Some students may require a high degree of structure, where learning is defined into a set of component steps. Other students may need only to be apprised of what outcome they should reach and they will structure the learning steps for themselves. At one extreme the content may be offered through programmed instruction with a series of small steps. At the other, the student can be turned loose in a library or given a selection of materials with which to work.

Another facet of structure where students may have genuine options is in the amount of feedback or guidance they receive. Some students may want and need to have someone who can answer questions, point to mistakes and verify what was done correctly. Other students may need nothing of this sort, except on rare occasions.

The final continuum on which the processes of instruction can offer true options is in the degree of repetition and practice the

student can have. Students should have the opportunity to practice and review the content to the extent necessary for them to learn. If the information can be stored and conditions set up so that students have easy access to the materials, then the opportunity to learn is not limited by administrative constraints. This is one of the chief advantages of using media--film, audio tape, filmloop and slides--as the means to present information to the student. The information can be recorded and stored so that students can review and practice at any time they need.

Limitations on Learning Options

It is unrealistic to assume that any process can be used to convey any content. The type of content may require certain processes for optimal learning. If the student is learning the pronunciation system of French, it is hard to conceive of a purely visual process to instruct students who need aural models to imitate, and a chance to practice and review the combination of sounds. In short, there has to be a match between the content and process.

In the teaching of skills, it is impossible to see a passive learning situation where the students are lectured on the tools and skills they need, without any active involvement on the part of the learner. In cognitive skills, it is hard to see students learning from a situation where they have little opportunity to work with a broad span of materials in order to acquire a broader vocabulary, read and write and build mathematical skills. It is sufficient at this point only to raise the issue because it will reappear in a different context in the course of the paper.

SUMMARY

The organizing principle of student-selected processes of instruction requires that students have options in the ways available for them to learn. Options may occur in two broad forms: *in the selection of the processes of instruction and in the organization of the processes of instruction.* If the students are to select the choice of media or situations for learning, then the same content has to be available in a variety of processes. If the students are to have the full range of alternatives, the processes have to be organized on a variety of continua: feedback, access, explicitness of structure, type of media and amount of mediation between the learner and content.

In selection, the nature of the content limits the potential range of media or situations for learning that can be made available. In organization, the nature of the content also limits the potential range of ways the content is structured for instruction.

PERFORMANCE-BASED INSTRUCTION

Performance-based instruction refers to the learner in that he is viewed as active and engaged in the acts of learning. Instruction is regarded as a process where the student actively learns.

The case for performance-based instruction is most apparent in skills. Students learning to sew, play baseball, and use tools cannot learn to do these things unless they become actively engaged in doing them. Conditions are arranged for skill learning that take note of the fact that students have to get involved, handle the materials and practice with them, with obvious advantages accuring to the students

and the instructors. Both know that learning is taking place because there is ready evidence of it in the nature of the student's performance. Both know how well the student has learned, and more importantly where problems are occurring. Feedback is immediate, so that the student himself realizes quickly what mistakes he has made, what he needs to improve and what additionally he has to learn.

Cognitive Abilities and Performance-Based Instruction

Can we speak of performance-based instruction in regard to cognitive abilities? We can, but we must recognize the limits. The point was made earlier that cognitive operations occur internally. We see only products of the internal operations in the form of written or spoken language, in the solution of problems and in the manipulation of the presented information. Thus we know that new information has been acquired because we arrange the conditions for the ability or the information to manifest itself. In cognitive operations we may be levels removed from the internal functioning itself because we can see only the end-result of perhaps an extensive period of reasoning.

The difficulty lies in the assessment we can make from the product. Two things are at play: the cognitive abilities of the students and the acquired information itself. We only see the result of the interaction. A student may write a poor essay because he has not acquired the necessary information itself, because he cannot write well or because of both. In contrast to skill assessment, where standards of performance can be based on ideal models of what the student should be able to do, cognitive assessment is much more problematic. The task

may be composed of many parts of which we can assess only the final stage or product.

There is a sound solution to this problem. The solution is to break down the product and examine what skills and abilities the student needs to learn at each stage of the way so that the ability to do the final product is reached by stages. Instruction follows a rational outline: teach the student to do the simplest things first, then teach him to do the more complex, finally teach him to do the most complex.

The Changes Required by Performance-Based Instruction

We need to think of schooling in totally different ways than we have. Usually we place students into groups based on chronological age, when there is very little indication that the members of groups are all at the same point in their learning. We offer them usually one method of learning that is highly teacher mediated. We ask them to digest certain amounts of subject matter daily, weekly and monthly. We verify at various points in time how well students have grasped the material and grade them.

To rearrange this situation, we must begin to regard each student as an individual. In testing this means to establish ways to find out where each student is in regard to a given skill or ability: what can he read, how well can he write, what kinds of mathematical problems can he solve. We need to discover what each student can do in relation to the skill or knowledge we propose to teach him.

1. Changes in Content.

In the area of content, we need to think of the skills or abilities the student will have after he receives instruction. This means far more than recasting objectives into the form of "the student will write a definition of the term, evolution, that meets the following criteria..." We should view the subject matter as not only information that the student will gain but as a field in which the student learns to explore and develop individual capabilities. In a subject matter discipline, such as biology, there are modes of thought and ways of examining nature that students can acquire as skills and capabilities and can use to improve basic cognitive skills, such as weighing evidence, reporting, experimenting, and problem-solving. The emphasis is realigned toward skills and abilities as the first priority and acquisition of information as the second priority.

2. Changes in Organization.

In the area of organization of instruction, the usual arbitrary time limits of a semester, quarter, and nine-month school year will no longer have justification. A student's progress through a given content will be based on his learning rate. He may be with shifting groups as he learns, the group being formed of the individuals who are all at the same learning point, all who are acquiring a certain ability or skill. The student moves on when he learns the skills or acquires the knowledge.

3. Changes in Processes of Instruction.

In the area of instructional processes, the dominant theme would be the active learner. In the usual classroom the teacher

faces an audience. He lectures and questions and they respond. The activity is orchestrated with little chance for each student to work with broad varieties of materials. In the new instructional environment, students individually would be actually doing a wide variety of things connected with learning. The purpose of the environment would be to provide both the materials and guidance the student needs to acquire the knowledge and learn the skill. The emphasis would be on active participation and confrontation of the learning environment. The student would be checked on what he can do as a result of working with the learning materials, rather than what information he has digested and memorized.

4. The Implications of the Changes.

The work that this solution requires is immense. The task would be made easier if we could rely on educational research that sheds light on how to structure the learning process or even on the nature of the learning process itself. But, unfortunately, all we have is a broken mirror. In some cases, we have a good picture of some parts, but the image does not come together into a recognizable whole. Some of the cognitive skills we have been discussing take a substantial number of years to develop, such as learning to read. If we adhere to the proposed solution above, we must then develop a network of reading abilities which lead from the most fundamental to the most complex. With such a network we could place students into exactly the right level to develop their skills further. It would be relatively easy to verify whether the student possesses the ability once instruction took place. But we do not have such a network

established through the process of research. We have some conception of the many factors that have an effect on learning to read; we have a conception of the fundamental skills a learner must acquire to begin to read; and we have possible ways to teach reading that appear to be sound. We have some of the parts, but we do not have a good composite image of the individual steps a learner must attain in sequence in order to read with fluency.

SUMMARY

The intent of performance-based instruction is to involve the student in active participation in order to develop abilities and skills. Its premise is taken from skill training. Students actively engaged in the acts of learning profit most from instruction. In brief outline we discussed both the prerequisites and implications of this instructional philosophy. It requires a drastic revision of the administrative and organizational structure of schools. Secondly, it requires a different conception of the selection and organization of the processes of instruction. To achieve performance-based instruction, we must:

1. Translate the present subject matter curriculum into a complex of skills and abilities that students will acquire as they proceed through the instructional system.

2. Provide the means to identify what skills and abilities that students have when they begin instruction in a certain content area.

3. Provide the means to verify whether or not students have acquired the skills which the instructional unit purported to teach.

4. Provide instructional processes that are based on the student's learning requirements and that lead the student to the skills and abilities that structure the learning situation.

5. Provide an administrative structure that permits the student to learn at his own pace and move on to new instructional units as soon as he attains the objectives of the unit.

6. Provide a new role for teachers as the managers and facilitators of instruction rather than conveyors of information.

FUNCTIONAL CONTEXT

Because this organizing principle frames one of the dominant themes of this paper, it will be discussed later in a separate section. At this point only a general review taken from Chapter 1 is necessary. If the conditions for learning are arranged so that the student sees the usefulness of that instruction and immediately can apply it to solving a problem, to doing something with the information or skill, that instruction is said to take place in a functional context.

To place instruction into a functional context, we need to take an abstract principle and see its effect in a concrete and actual situation. We need to relate a distinct skill to its utility in performing a real-life situation. We need to relate skills and knowledges to careers, to what they enable people to do in actual job situations.

III. TYPES OF LEARNING AND THE PROCESSES OF INSTRUCTION

The sponsoring agency has divided comprehensive career education into four domains of competence. The students are to have the opportunity to build career, personal, social, and cognitive competencies.

Career competence means that students can receive instruction leading to entry into a career or a group of careers. Social competence means that students will have the chance to learn how to participate in groups, interact with others, and acquire social responsibilities. Personal competence means that occasions will be provided so that the student can explore his self, needs and values. The final area of competence is in cognitive process skills. In order to participate in society, have the basis to learn outside of formal instruction and continue education in the future, students need to acquire fundamental cognitive skills. This usually means to learn to read, write, use mathematics, reason from evidence, draw conclusions, act and make decisions.

These four domains of competence in reality describe what types of learning should occur in the instructional system. The task is to provide environments for learning to take place in the four domains. Learning environments is used as a summary expression to describe the collective kinds of instructional processes essential to bring about learning in the four domains.

CAREER LEARNING

There are two levels of learning necessary to prepare students for careers. At the first level, students need to gain a conception of possible career roles and assess requirements of careers in relation to themselves as individuals. At the second level, students need to equip themselves for entry into a career. To choose among options, students need exposure to various careers, information about employment trends, information about what education the choice entails and a chance to appraise themselves as individuals in relation to career roles. Under the organizing principles of the instruction system, it is important to stress that a choice should not be forced upon students. Students might spend their entire time in the system without organizing their instruction around a central focus. Rather, they might want to pursue a collection of short-term interests, without choosing a life's work.

Once a choice has been made, the student can turn to the second level of career learning. Any career is composed of a series of basic skills and knowledges that must be acquired in order to enter them. The prior skills and knowledges might be very simple and general, such as those needed by an assembly worker on a production line, to very complex and highly specific, such as those needed by a plastic surgeon or corporation lawyer. The demands that various careers place on students can be classified then into an instructional sequence which takes students from the rudimentary skills necessary to begin instruction itself to the final set of skills and knowledges for career entry.

It should also be apparent that career learning blends into the other domains. By virtue of exposing students to learning situations where they can choose, we can also help the student to acquire social and personal competence. Students can develop decision-making abilities by learning to weigh aptitudes, interests and goals in relation to a career role. By exposure to career roles, students can learn to interact socially with future employers, employees and other students.

Career Education and the Processes of Instruction

What kinds of learning environments will meet the needs of career education: First of all, students need some conception of what the full dimensions of career are. They need a chance to see what people actually do in the career and talk to them about their daily activities. The students need a chance to participate in some activities that a career might involve. Secondly students need information about various careers: employment possibilities, economic projections, educational requirements, earnings and advancement possibilities.

All these experiences and information can aid students to learn to weigh the importance of various factors, choose among options, and see the repercussions of their choice over time. Additionally, they can learn to weigh possible careers in relation to their personalities and values, thereby learning how to make decisions.

1. Experiences for Career Choice.

The nature of these experiences really prescribe that the students be taken outside of the classroom for an appropriate learning environment. The environment for these experiences has to be as close as possible to people working in various careers.

It might be possible to fragment the learning requirements into several components: observation of careers and simulation of decision-making processes about careers. But, by taking most of the experiences outside the classroom, the students would gain much of the same content in a more functional context: From interacting with people working in careers, students can get information about jobs. They can see the full implications of various choices from the lifestyles of people who have already chosen. The conventional learning environment would be held to a minimum. Instead, students would talk about their experiences, report to other students about them and receive help and direction from a teacher-counselor in informal groups at some "home base."

It would be impossible to structure these learning experiences around predetermined instructional objectives that precisely state the outcomes the students must attain. This learning environment is only directed toward facilitating student choice. It cannot constrain the student to choose, nor can it specify what choice the student should make. At most, it can only arrange the conditions so that students can make a choice based on experience and information.

2. Experiences Necessary for Career Preparation.

The second emphasis in career learning is for the student who have chosen a career. This learning has to be based on the skills and knowledges necessary for entering the career. In designing the processes of instruction, the consortium has many options for initially presenting the content to be learned. At this point, we will only talk about the general characteristics of the learning environment:

A. There has to be an environment which introduces the knowledges and skills that students need for career entry.

B. There has to be an environment which permits students to perform all the skills in combination in a setting like the one in which they will work.

Initially, skills can be introduced to the students in a very controlled environment to make sure that the students have the fundamentals well in hand. They can learn the components of skills within a directed environment that meets all the requirements of a pre-planned behavioralized instructional system.

At a later stage, the learning environment has to offer the students a chance to apply and integrate these skills in a "real-life" setting. The instructional objectives would now shift to measure more complex and integrated behaviors. The student learning carpentry would not be evaluated on how well he has the component skills of hammering, nailing, measuring, cutting in hand, but how well he can do all these operations to achieve a product or tackle a problem.

PERSONAL AND SOCIAL LEARNING

A learning environment in these domains can only be thought of as facilitating. We can arrange the conditions for this learning to occur. Whether or not students will change their personal values, redefine their needs and change their self-images cannot be stipulated to any exact degree beforehand. We can expose students to situations where they may interact with others and learn codes of behavior. We can help them develop insights into their own behavior in relations with other people.

Whether or not students will benefit from this exposure and make changes in the ways they relate to other people cannot be stipulated by instructional objectives.

The purpose of instructional objectives is to describe what exact behaviors students will acquire *as a result of instruction*. Instruction serves as the agent to cause change in behaviors or as the means to acquire new behaviors. In social and personal learning we cannot assume that the instructional processes will function as causal agents.

There is a compelling reason why we should not do this. Exact social templates do not exist which specify how people must guide their conduct. We cannot, nor should we, determine what career a student must enter, based on his intelligence, race or economic background. We should not specify what values must be the focus of a person's life nor tell students how to regulate their relations with other people. Those choices belong to the individual.

Social and Personal Learning and the Processes of Instruction

We can describe three ways an instructional environment can help to facilitate learning in these domains:

A. To provide students with information about what standards of behavior careers place upon people involved with them.

B. To help students to inquire into their personal values and needs through discussion, participation, and interaction.

C. To provide multiple situations where students can interact with each other, with people in the community, with people working at various careers, in a wide variety of social contexts.

These three features of a learning environment require that we end the traditional isolation of teenage students in classrooms, where for a large part of the day they meet only teachers and other students. The community that surrounds the school provides the necessary context for the learning environment. Through involvement with the community, students will be exposed to a wide range of people, value systems and social interactions. This involvement should help students formulate and inquire into their own personal values. The students will also find out what social codes of behavior are necessary for participation in the community and in a career.

The one important feature this environment lacks is the means for students to consolidate their experiences. Through discussions with other students who have faced the same experiences, with the teacher serving as disinterested third party, the students would have the means to report and weigh experiences against the experiences of others. To provide this environment the instructional system should include a neutral "home base."

COGNITIVE LEARNING

Earlier we distinguished cognitive from skill learning on the basis that cognitive learning deals with internal operations of which we can mainly see written or spoken products. Since we cannot directly interfere with the internal network of operations, we must arrange situations from which the student is to learn. We infer the student has learned from the problems he can solve or tasks he can perform.

Because we know very little about these internal operations, we channel instruction to the external manifestations of cognitive processes:

A. The most obvious process is the use of language. The core of education through the centuries has been to teach the young to read and write.

B. The second process we teach is quantitative reasoning--using mathematical systems to conceptualize and structure our physical environment.

C. The third process we teach is an amalgam of the strategies man has used to conceptualize his own works, physical matter, his past and himself.

The teaching of all three processes has been a central focus of Western education throughout its recorded history.

The organizing principles of the EBCE model mean to replace the traditional classroom with a new approach. We discussed the general features of the approach as it relates to cognitive learning under the labels: student-selected processes of instruction, self-paced instruction, and performance-based instruction.

Cognitive Learning and the Processes of Instruction

Each type of cognitive learning poses special requirements for the EBCE model and its learning environments. We will examine these requirements for each type in turn:

1. Language Learning.

The learning environment will probably not have to deal with students who are just beginning to read. Therefore, the emphasis will be on developing the skills the students already have. Because language skills are generic ones, they can be approached instructionally in two ways.

They can be taught as distinct, separate skills at a reading and writing center. Or they can be taught in coordination with other instruction. For example, students studying biology can also improve their reading and writing skills together with instruction in biology.

Students will of necessity produce written and spoken products when they are actively engaged in learning. The kinds of products they are to produce can be specified through instructional objectives. We can combine development of language skills with the other skills through the kinds of objectives we design for an instructional unit.

Both instructional approaches should be used. Entering students who are seriously weak in reading and writing skills may have to remain at a language center until they develop their skills to a minimal, acceptable level. Instruction in other learning domains should include objectives designed to develop language process skills. Direct instruction in reading and writing skills should be reserved for those students who have serious language problems.

We are talking about a process approach versus a content approach for language processes. In the content approach we would be interested in structuring instruction around information and knowledge. *In the process approach instruction would be centered upon preparing students to operate with the knowledge and information.* The content approach ultimately leads to verification that the students have acquired the information and knowledge. The process approach ultimately leads toward seeing what the student is able to do with the acquired information and knowledge.

2. Quantitative Reasoning.

The learning environment will have to deal with students who are learning various mathematical systems, such as geometry, algebra and calculus. Traditionally, these systems have been taught as formal subjects with little or no stress on the solution of applied problems. These systems also are seldom taught in relation to how people use them in daily life and work.

Instruction has to be of a long-term nature both in primary acquisition of these systems and in the application of these systems to conceptualize the physical universe. The long-term nature has substantial implications for the learning environment. First the learning environment must serve as the means to introduce the students to these systems. Secondly, the learning environment must provide the occasions for students to apply the operations they initially learned in various contexts.

The learning environment should provide multiple means of acquisition and application: through instruction in the systems, through use of mathematics in various fields of study and through career orientation. The impetus in this learning is to prepare students to function with generic mathematical skills to solve the broad spectrum of problems they face daily or will in the future.

3. Learning in the Formal Disciplines.

Man has ordered knowledge and schematized past experience into formal disciplines. As knowledge accumulated, the number and the extensiveness of these disciplines grow. These disciplines offer powerful conceptual strategies which we teach the young to conceive the past, the physical environment and themselves.

These disciplines formed the traditional base of education and determined the subject matter of education beyond primary schooling since the Greek academies and the establishment of universities. The methods of instruction became more rigid and formalized as the disciplines became more codified and the knowledge more extensive and diffuse.

Rather than teaching the disciplines as modes of inquiry and as a means of investigating problems, we taught the "facts" that these disciplines accumulated under the paradigm of read, remember, and regurgitate.

The knowledge explosion--the rate at which men working in these disciplines accumulate information and codify it within theoretical frameworks--brought a crisis in education. It became increasingly apparent that students could no longer digest past work in these disciplines and arrive at the creative forefront without early specialization or unless the disciplines were massively reorganized in the ways they are taught. The prevalent solution has been early academic specialization by those students who will continue to higher education.

One of the chief innovations in the Sixties was to restructure the instruction in scientific disciplines. In very loose terms the innovation has been to direct learning toward the fundamental processes the disciplines use to inquire into nature. Learning then is directed toward adoption of cognitive strategies rather than the ingestion of a body of important facts.

This emphasis is clearly in line with the organizing principles of the EBCE. Instruction in all disciplines should be oriented toward

the process approach, both in learning about the disciplines and their relation to functioning in a career and in life. The learning environment would direct learning toward the operations the student is able to perform by studying and working within the disciplines. As a consequence, students will no longer study biology or history, but they will learn to approach, for example, nature and the past through the strategies biologists and historians use in their investigations.

IV. FUNCTIONAL ENVIRONMENTS TO FACILITATE LEARNING

Based on the organizing principles and the types of learning that are to occur within the instructional system, three main environments can be established. These environments are: Skill Acquisition, Applied Products and Seminar.[1]

The Skill Acquisition Environment. The instructional system must establish instructional processes by which students acquire skills whether to enter college, pursue a career or satisfy various short-term interests. Primary acquisition of skills can be *pre-planned* through the use of behavior objectives specifying the terminal behaviors students must acquire. The processes of instruction can be *programmed* which allow maximal self-instruction and self-choice by students themselves. The learning experiences can be *formalized* into an instructional sequence through which the student must proceed in order to acquire the skills--whether improving reading, learning algebra, or acquiring the composite skills of carpentry.

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[1]See Fred M. Newmann and Donald W. Oliver, "Education and Community," *Harvard Education Review*, Vol. 37, No. 1 (Winter, 1967) pp. 95-105.

This environment deals primarily with those learnings that can be systematized from the domains of cognitive and career entry skills. Students will be provided with the primary skills on which they can build subsequent learning. They will be provided with instruction that takes into account their prior abilities and knowledges, their rate of learning, and their choice of learning method.

Instructional processes in this environment may make use of the rich possibilities from educational technology--programmed instruction, individual study carrels, computer-assisted instruction, for example--in order to permit students to learn at their own rate and have options in the methods by which they acquire skills.

The Applied Products Environment. Not only must students have the means by which to first acquire skills, but they must have a context in which they can apply these skills. In learning skills, students need the chance of using the skills to achieve a product or solve a problem. This learning can be regulated by the product the student is to attain. The problems and products the students are to solve and produce might include:

a. for students learning carpentry, remodelling a house, building a new house, building furniture;

b. for students learning biology, participating in ecological research in a community;

c. for students preparing to be teachers, working in tutorial programs with young children, working with peers to help them attain skills they have themselves acquired;

d. for students learning journalism, preparing radio broadcasts, printing a newspaper, preparing photographic essays.

The list might go on and on with further examples, but the main point should be apparent. A necessary environment for learning skills can be described by the large sphere of activities in which students can apply skills learned.

This environment requires that students leave the classroom and go into the community in a variety of locales; a factory, a laboratory, a hospital--in short, wherever community resources and facilities can be opened. The structured environment of skill acquisition is no longer necessary, rather skill development now has occasions for learning by action to take place through problem and product-oriented activities. *The activities themselves become the processes of instruction.*

With the community as the learning environment, students no longer require a teacher or a communication medium as a mediator between them and the skill to be applied. The teacher would have the new role of guide and counselor who works to solve problems, advise students and manage logistic and administrative concerns. It is to him that students report, account for their activities and bring problems.

Students at loose in the community will also have the chance to interact with other members of the community in a variety of roles. Students learning crafts can work with experienced men and women, possibly as apprentices. Students learning political science may work as helpers in political campaigns. Students who are studying speech may act in a community playhouse with experienced actors. In the

community, many adults are working in activities that students will be learning. It would be educationally useful for both adults and students to interact.

The community also serves as a reservoir of opportunity from which students can sample career choices. Students still undecided about a career can use the community as exploratory space. Men working at a craft, men acting within the total context of what they do--provide an invaluable extension to the limited experiences that other environments might offer.

The Seminar Environment. The final environment provides occasions for students to place career definition and pursuit of goals into a broad social perspective. The purpose of the seminar context would be deliberation and reflection on the meaning of work, leisure and social roles.

Learning in this environment would not be determined through the use of instructional objectives. This environment establishes processes for students to discuss with other members of the community ultimate questions of self-definition in relation to society and the society itself.

The Four Environments in Relation to Types of Learning. A diagram illustrates the types of learning that are to occur in the EBCE in relation to the environments.

	Personal	Social	Cognitive	Career
Skill Acquisition			X	X
Applied Problems	X	X	X	X
Seminar	X	X		X

This diagram shows the main learning intent of each environment.

1. Skill acquisition would permit students to acquire the basic skills needed for career entry, to learn cognitive skills, and even to acquire skills chosen for purely personal, short-term interests. Instructional processes in this context will be structured under the concepts of instructional technology: objectives in the form of behavioral outcomes, self-pacing of instruction,and testing under mastery standards, The processes of instruction are any that permit students to learn at the rates they choose.

2. The applied problems environment includes all four types of learning. Instructional processes for *personal and social learning* can only be thought of as facilitating. We offer students the entire sphere of the community in this environment for social and personal learning, through the wide variety of contacts they will have with the members of the community. Instructional processes include adopting social roles, interacting with numerous individuals, and self-regulating behavior.

Career learning is especially facilitated by observation of actual career roles and working with people pursuing various careers in the community. This environment also permits students to develop and integrate *cognitive* skills by tackling a wide range of problems and tasks.

3. The seminar environment stresses personal, social and career learning. It provides personal development in the sense that students can raise questions about the implications of career choice. It provides social development through the mechanism of group interactions.

It aids in career learning by furnishing a perspective through discussion about large questions dealing with personal choice and career roles in relation to society. The only instruction processes included in this environment are group discussion and personal interaction with a counselor, other students and members of the community.

Educational Media in Relation to Types of Learning. Much of the use of educational media is premised upon classroom learning. They serve as means by which we can bring a wealth of experiences into the classroom, which would otherwise be unavailable to students. Since the contexts outlined above put an end to the classroom as the primary physical environment, media and technology can no longer serve the purpose of extending the walls of the classroom.

The most direct application of media and technology lies in the skills acquisition context, but under a new set of premises. Media are powerful tools to bring about student-selected processes of instruction and self-pacing of instruction, i.e., the individualization of instruction. We can use computers, filmloops, slides, tape recorders, books, programmed instruction, so that students can learn at their own pace and in order to provide them with options in ways that they can learn. Their primary usefulness lies in the fact that information can be stored and retrieved at the convenience of the student. The student can have as many repetitions as he needs and work as fast or as slow as he likes.

V. CONCLUSION

The purpose of the preceding discussion was to offer a general background on the processes of instruction. It would have been impossible

even to discuss the processes without bringing into discussion the organizing principles of the EBCE, the types of learning which are to occur in the EBCE, and the concepts of an instructional system. Because these factors are so enmeshed and so important to determining instructional processes, this paper devoted the main emphasis to, hopefully, a clarification of the relationships.

There were two major points made during the paper. The first point is that the processes of instruction should be properly selected only after the goals of the instruction are clearly aligned and after the content to realize the goals is established. It is only at that point the consortium should concern itself with the concrete and specific processes of instruction that they will use to aid students to learn.

The second point is somewhat more complex and centers around the physical environments for learning. So many instructional processes are premised upon group instruction in a classroom that it has conditioned our thinking exclusively to that context. We tend to think of processes of instruction as the means to extend the classroom, to effect more learning, and end some of the inequities of isolation of students into classroom groups. In many ways our thinking about the processes of instruction have been too narrow, too encapsulated by the premise of group classroom instruction. Once we allow that the extreme logical end to this premise is unrealizable--namely that we can consolidate all learning within such an environment--then many of the ways we thought of to aid learning were pseudo-solutions. They were false solutions because we seldom strayed beyond the confines of the classroom to think about ways to present instruction.

In this paper we offered the solution as others have done of ending the isolation of students by using the *resources of the community as the processes of instruction*. Rather than extending the walls of the classroom through media and technology, we can instead demolish them by conceiving of the community as the classroom. Through the community, students can learn about careers, life and themselves more comprehensively than through the richest use of educational technology and media in an isolated environment.

But to throw away the classroom is unnecessarily extreme. It is still useful, under a different set of premises, as a worthy means for students to acquire basic cognitive and career skills. The premises are that we permit students to learn at their own rate, that we outline the objectives in terms of outcomes students can perform, and that we ensure that students have acquired the basic skills and knowledges before they acquire more complex ones. If we accept these premises, then we can turn to educational media for the tools to facilitate individual learning.

Chapter 4

INSTRUCTIONAL MODEL: IMPLEMENTATION AND MANAGEMENT

Elaine N. Taylor and Robert Vineberg

This paper presents a general outline and discussion of events that will occur in the implementation and management of the instructional model. The first five sections of the paper deal with tasks that are prerequisite to the selection of jobs to be included in the EBCE. In these sections the development of some elements of the program are discussed. Section VI treats the criteria for selection of jobs. This is followed by sections which discuss the organization of the instructional system, the selection of personnel, and completion of development of the model. The final sections deal with implementation, evaluation, and revisions of the program.

This paper does not attempt to provide a definitive statement of all implementation and management procedures. At present it is virtually impossible to identify the many critical issues, problems, and contingencies that will arise. It is recommended that a small-scale pilot program be undertaken to be followed by at least a second pilot run which incorporates modifications based upon experiences of the initial run. Only after the second run is accomplished can a reasonably complete statement of guidelines and procedures for implementation and management of the instructional system be prepared and only then should full-scale implementation occur.

Several other study areas are related to the discussion in the present paper. These are listed below.

Study Area No.	Title
3	Cost
7	Instructional Model: Bases and Rationale
8	Instructional Model: Intended Outcomes and Content
9	Instructional Model: Process
10	Instructional Model: Evaluation
12	Instructional Support
13	Guidance, Counseling, and Pupil Personnel Services
14	Management and Organization
15	Evaluation: Systems-Level
16	Facilities, Materials, and Logistics
17	Staff and Other Personnel Services
18	Information Systems
19	Technical Input and Exemplary Practice

I. COLLECTION OF INFORMATION ABOUT THE COMMUNITY NECESSARY FOR PLANNING THE DEVELOPMENT OF THE EBCE INSTRUCTIONAL SYSTEM

The structure and composition of the EBCE will, in large measure, be determined by certain basic characteristics of the community. Various kinds of information about business and industry, avocational resources, and potential students and their parents are needed to initiate the development of the EBCE instructional system.

First, the types of businesses and industries[1] that are willing to

[1]Business and industries should include local government and other civic organizations as well as volunteer agencies.

participate in the EBCE must be known. What kinds of jobs are these businesses and industries willing to provide for use by the EBCE? For each of these jobs, what are the potential number of training placements which could be made? Likewise, for each of these jobs, what is the potential number of permanent placements which could be made? Which jobs have incumbents who would be willing and suitable to participate as instructors in the EBCE? It is assumed that most of the foregoing information can be obtained through a review of materials already available as a result of the formation of the EBCE consortium.

Second, the avocational resources available to the EBCE must be explored. What number of students can a particular facility accommodate at any particular time? For activities which ordinarily entail costs to participants, can arrangements be made for students to participate on a low or no-cost basis? Can the facility provide personnel to offer guidance to students to enhance their avocational experiences? Finally, can the facility provide personnel to interact with appropriate members of the EBCE instructional staff to furnish information on student activities? Some of this information, as with that descriptive of business and industry, is likely to be available immediately as the result of the formation of the consortium. Where additional information is needed, it will most likely be obtained through interview.

Third, preliminary information is needed about the number of students who would be likely to enroll in the program, their characteristics such as age and grade level, and the jobs and avocational pursuits they prefer. The consortium is not likely to possess this information. It is proposed

that this information be obtained through a questionnaire to be developed and administered to a selected sample of students currently attending school and school age children not presently in school. (The latter would probably be identified through school records.) A similar questionnaire should be designed for administration to parents to determine their willingness to see their children enrolled in the program and to ascertain their job preferences for their children. (In both questionnaires the jobs and avocational facilities identified in the first two steps would be listed.) Questionnaires would be administered in schools, by mail, and possibly through a door to door survey if necessary.

II. IDENTIFICATION OF JOBS FOR TENTATIVE INCLUSION IN THE EBCE

Following the gathering of information about the community, jobs would be selected for tentative inclusion in the program. Major factors to be considered in this selection are: the training and job placement opportunities associated with each job, student and parent preferences, and the average earnings in each job. (One of the principles of the EBCE is that students acquire a job skill that will provide them with a means of self-support.)

III. THE ANALYSIS OF JOBS

The organizing concepts discussed in Chapter 1 dictate that the job be the focal point of the instructional process. Instruction in basic education and in the cognitive, social, and personal domains is to occur, to the maximum extent possible, in the job setting. The extent to which these competences can be acquired during job training and job performance

becomes a major determinant of the structure of the instructional system. Development of the instructional system begins with an analysis of each job. If resources do not permit the analysis of all candidate jobs, those selected for analysis for the pilot program should probably offer the widest possible range of skill and knowledge requirements. Jobs should be analyzed to determine the following:

A. Performance requirements for minimal marketable skill. These requirements form the basic for stating training objectives.

B. Training content and experiences necessary to meet training objectives.

C. Prerequisites for job training, including aptitude requirements, skill and knowledge requirements (educational achievements), and physical abilities and characteristics. These prerequisites should be derived from a job analysis rather than taken from pre-existing materials that may have been developed earlier on a less objective basis by business and industry.

D. Identification of basic education and domain content to which a student would be exposed during the job training process.

E. Identification of basic education and domain content to which a student would be exposed during subsequent performance of the job. It is necessary to consider the educational and domain content covered both during training and during job performance since: (1) not all students will be involved in job performance subsequent to training and (2) content may very in these two situations. As examples, some enabling content imparted during training may not be represented in job performance;

job performance may involve interactions with others (social domain) that is not represented in training.

IV. THE ANALYSIS OF BASIC EDUCATIONAL AND DOMAIN OBJECTIVES

Parallel to the analysis of jobs is an analysis of the overall core basic educational and domain objectives to be attained by every student participating in the EBCE. Both core educational objectives and cognitive, personal, and social domain objectives must be specified. The content and experiences necessary for attaining these objectives must also be specified. These objectives are established independent of any requirements derived from jobs.

V. DELINEATION OF EDUCATIONAL AND DOMAIN COVERAGE PROVIDED IN JOBS

Once jobs and educational and domain objectives have been analyzed, it is possible to determine both the variety and degree to which basic educational and domain objectives can be met in each specific job training-job performance sequence. The overlap of educational and domain objectives with specific job training and performance characteristics provides a major criterion for the final selection of jobs for inclusion in the EBCE. For each specific job, provision must be made for students to attain those educational and domain objectives that cannot be reached via experience in the training-performance sequence. Some variety of supplemental training, probably occuring at learning centers external to the job situation, will have to be introduced.

Each job should be analyzed to determine points in the training-performance sequence where specific educational and domain objectives

will be reached. Divisions within a job where training and performance progress would naturally be measured will not necessarily correspond to points at which particular educational and domain objectives will be attained. Thus it is necessary to specify points at which progress in job training and performance are to be measured as well as points at which the attainment of educational and domain objectives are to be measured.

VI. FINAL SELECTION OF JOBS FOR INCLUSION IN THE EBCE

Following the delineation of educational and domain coverage provided by each job training-performance sequence, a final selection of jobs for inclusion in the EBCE will be made. It is assumed that it will not be possible, particularly in the pilot program, to implement and manage all candidate jobs originally identified for tentative inclusion in the EBCE. This selection will be based upon consideration and trade-off among the following factors:

A. Job coverage of educational core and domain objectives.

B. Student and parent job preferences identified in the questionnaire survey.

C. Potential number of training placements which could be made for each job identified in the collection of community information.

D. Potential number of permanent placements which could be made for each job identified in the collection of community information.

E. Representation of different job families in the instructional system. This information is available as a result of the analysis of job training and performance requirements.

F. Willingness and suitability of incumbents in particular jobs to serve as instructors in the EBCE. This information is available from the study of community characteristics and would be supplemented by observations made during conduct of the job analyses.

VII. DEVELOPMENT OF PROTOTYPE PATTERNS OF INSTRUCTIONAL SYSTEM: ORGANIZATION AND INFORMATION FLOW

Once the jobs to be included in the EBCE have been selected and educational and domain coverage provided in these jobs has been identified, it will be possible to diagram the general sequence and organization of instructional events. Patterns of events that will arise with particular jobs and combinations of jobs can be described. The jobs that will be selected for the pilot model are, of course, presently unknown. Hence, diagrams of some probably organizations of instructional events, presented in Figures 1 - 4, have necessarily been drawn in a generalized form. The figures are not organized with respect to specific jobs but rather are based upon representations of jobs providing: (1) a basis for job choice (the JC blocks), (2) some orientation and experience in jobs (the JE blocks), and (3) training for a minimal marketable skill (the JT blocks).

These generalized descriptions of the sequence and organization of instructional events and interactions are provided to give the reader some explicit examples of the authors' conception of the manner in which the model is likely to operate and to provide a framework for a number of succeeding sections of this paper. When specific jobs are known, precise patterns of interactions can be diagrammed by the consortium. A

PROTOTYPE PATTERNS of INTERACTION & INFORMATION FLOW

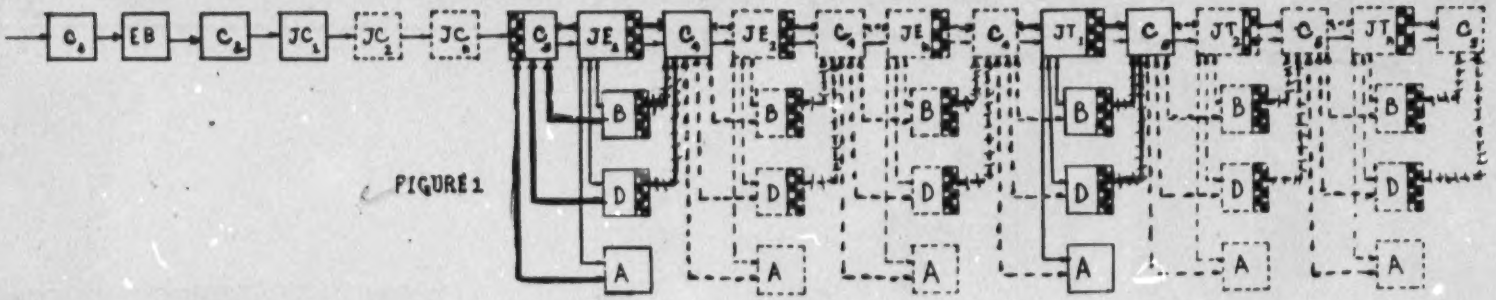

FIGURE 1

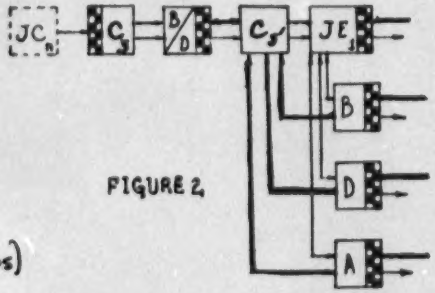

FIGURE 2

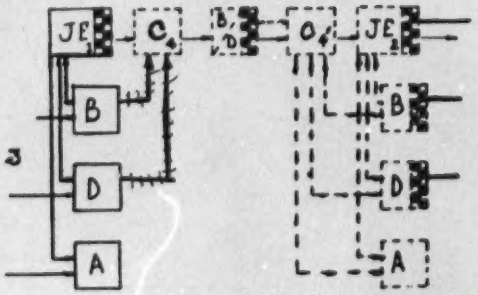

FIGURE 3

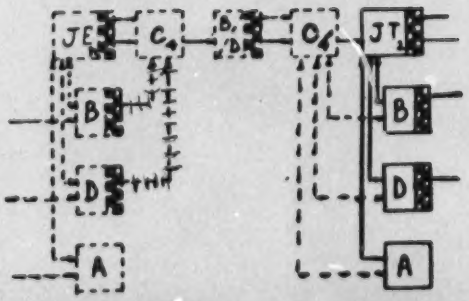

FIGURE 4

C - Counselor Activity.

EB - Administration of Entry Test Battery.

JC - Job Choice Activities.

JE - Job Experience Activities (Experience in Several Jobs)

JT - Job Qualification Training (Marketable Skill).

B - Basic Core Education External to Job.

D - Domain Education External to Job.

A - Avocational Activities External to Job.

→ Movement of Student

▬ General Information Flow Between Counselor-Advisor and Instructional Sites

+++++ Test Information Flows from Instructional Sites to Counselor Advisor

▦ Criterion Testing

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representative set of such diagrams, based upon jobs in the consortium, could be used to orient students to the structure and operating procedures of the instructional system and to provide a means for describing alternate instructional patterns (arising with different job choices) to both students and staff of the EBCE. Individualized diagrams, reflecting the job choices of each specific student, could be used to identify critical points in the documentation and tracking of student progress and would become part of each student's permanent record.

Figures 1 - 4 about here

Events diagrammed on a generalized basis in Figures 1 - 4 are as follows:

Figure 1 - In block C-1 the student receives a general orientation to the EBCE instructional program from the counselor-advisor. In block EB the Entrance Battery is administered. In block C-2 the counselor-advisor and student confer and the student selects the jobs he will explore to meet the requirements for Basis for Job Choice. JC blocks represent the Basis for Job Choice experiences. In block C-3 criterion testing of Basis for Job Choice objectives occurs and the counselor-advisor and student confer to reach decisions about those jobs to be included in meeting the requirements for Orientation and Experience in Several Jobs. In block C-3 the counselor-advisor exchanges information with a job experience site, with the Basic Education and Domain Centers, and with student-selected avocational sites to determine their capability to accept a student at that particular time. Once the student is placed, the counselor-advisor obtains

information from each of these locations about student attendance, student problems, and in the case of the A block receives a report about student avocational experiences. JE blocks represent the Orientation and Experience in Several Jobs activities. Block B represents the experience the student receives in the Basic Education Center, block D represents the experience the student receives in the Domain Center, and block A represents his avocational experiences. At the conclusion of experiences in blocks JE, B and D, criterion testing occurs and this information is transmitted to the counselor-advisor as part of block C-4. In each C-4 block the student confers with the counselor-advisor and makes further decisions regarding either additional JE experiences or regarding his selection of a Minimal Marketable Skill (JT block). In C-5 blocks the student confers with the counselor-advisor and makes further decisions about additional JT experiences.

Figure 2 - This figure depicts a variation of Figure 1 in which a student requires experience in either the Basic Education Center and/or the Domain Center before proceeding to any JE block. This could occur if the student, having certain deficiencies, needs these additional experiences either before proceeding to any JE block with its associated Basic Educational and Domain Center activities, or because he has selected as his first JE experience a particularly demanding job.

Figure 3 - This figure represents a similar variation where a student has completed at least one JE block but must acquire certain

Basic Educational and/or Domain competences prior to entry into his second JE choice.

Figure 4 - This figure represents a variation in which Basic Educational and/or Domain competence must be acquired before the student enters a JT block.

VIII. PERSONNEL

It is anticipated that the development and implementation of the instructional system will require at least the following personnel:

A. Instructional staff at each job site and at educational core and domain centers.

B. Counselor-Advisors

C. Managerial personnel

D. Specialized staff (e.g., speech therapist, nurse)

E. Troubleshooting group (to observe, identify, and remedy deficiencies and dysfunctions of the instructional system)

F. Consultants

G. Evaluation group (for independent evaluation of the instructional system)

H. Avocational resource personnel

As these staff members are acquired they will require orientation in the philosophy, goals, and organizing principles of the EBCE. They will need to be familiar with all of the information previously developed, such as information about jobs, student preferences, all objectives and content of the program, etc. Finally, they will be

assigned to the development of specific aspects of the instructional model.

Prior to the implementation of the pilot model, complete descriptions of staff duties will have to be prepared. The counselor-advisor role deserves special attention since, as was seen in Figures 1 - 4, it occupies a key role in the instructional system. The counselor-advisor evalutes student performance on the entrance battery; he advises students on a continuing basis, monitors and documents their progress, and assists them in movement among various learning sites.

IX. COMPLETION OF THE DEVELOPMENT OF THE INSTRUCTIONAL PROGRAM

A number of elements of the instructional model remain to be developed. Following their development all content elements will be organized into a sequence largely dictated by the goals and organizing concepts of the EBCE. Content will be organized in conjunction with the selection of methods and media for communicating content.

A. Initial Job Experiences

1. The concept, "Basis for Job Choice," must be defined in terms of behaviorally stated objectives. Content requirements, discussed in Chapter 1, must be developed to enable students to meet the objectives.

2. Similarly, the concept, "Orientation and Experience in Several Jobs," must be defined in terms of behaviorally stated objectives. Presumably these objectives will represent some sub-

portion of objectives already defined for attaining "Minimal Marketable Skill." (See section III.A. of this chapter.) Content to enable the student to meet these objectives must be selected from that previously identified for attaining minimal marketable skill. (See section III.B.)

B. Basic Educational and Domain Objectives to be Attained in Conjunction with Initial Job Experiences and in Acquisition of Minimal Marketable Skill

It is desirable to make the students' initial experiences in the EBCE considerably different from those he has encountered in traditional schooling modes, and to place him in immediate contact with the world of work. As a consequence, his first learning experiences in the EBCE--developing a basis for job choice--will not involve any requirements leading to competence in the basic educational core or domains. As depicted in Figure 1, instruction in basic education and in the domains will be initiated in conjunction with gaining orientation and experience in several jobs. This strategy has the benefit of providing at least some opportunity for basic educational core and domain instruction to occur within a functional job context. Since competence in basic education and the domains is to be accomplished in conjunction with acquisition of experience in several jobs and development of minimal marketable job skill, it is desirable to identify those core and domain objectives to be reached upon completion of each of these separate phases of the training sequence. Content appropriate for objectives to be met in each phase must be selected from that identified earlier. (See section IV.)

C. Organization of Content and Selection of Methods and Media

When content to support a basis for job choice, orientation and experience in several jobs, marketable job skill, core education, and domain competence has been identified, it will be organized in accordance with the goals and organizing principles of the EBCE as described in Chapters 1 and 2. It is presently assumed that the subject matter within the basic core education area is hierarchical. The job covering the fewest steps in the hierarchy will determine the lowest level module which must be developed for core instruction external to the job. Modules for core subjects must be developed to permit an individual to enter the basic education program at any level. Domain modules must be prepared to cover instruction for all domains at all levels since many or most domain objectives may not be hierarchical and it is therefore likely that all modules will be needed for instruction external to the job.

Methods and media for communicating content in all areas of instruction will be selected in accordance with guidance provided in Chapter 3.

X. ADDITIONAL REQUIREMENTS OF THE PROGRAM

To complete the pilot model a few additional tasks remain.

A. Development of Student Orientation Procedures.

Student orientation procedures will include three elements: (1) an explanation to the student of the job and instructional options available to him in the EBCE; (2) an explanation of the instructional patterns and procedures that he will be exposed to, e.g., instructional

sequencing and duration, measurement of progress, counseling and decision points, physical location of instructional sites, and movement between the job, core education, domain and avocational sites; (3) an introduction to the need and role of aptitude, achievement and interest testing.

B. Development and Conduct of Instructor Training

The need for orientation of all staff members has been discussed earlier. (See section VIII.) In addition, instructors will probably require some training in their specific duties.

C. Planning for Student and Staff Transportation

Transportation requirements and procedures can be discussed only when student load is established and the number and location of instructional sites are identified.

D. Development of Record Keeping Procedures

Records will need to be kept of at least the following information:

1. Entrance battery test results
2. Diagnostic test results (see section XI)
3. Individual evaluative test results (see section XI)
4. Individualized diagrams of student job choices and experiences
5. Student avocational experiences
6. Student attendance at job, basic core, and domain centers
7. Health records

E. Development of Procedures for Procurement, Storage and Dispersal of Supplies and Equipment

Only when the instructional model is under development can these procedures be specified.

F. Development of Troubleshooting Procedures

Procedures will need to be developed for a troubleshooting team to be able to observe, identify, and remedy any deficiencies or dysfunctions of the instructional system. This group would also, conceivably, be available for student conferences to provide assistance with particular complaints and problems.

G. Development of Testing Procedures

Several varieties of testing are required in the EBCE. These are discussed in the next section.

XI. DEVELOPMENT OF TESTING PROCEDURES

Three varieties of testing will be included in the instructional model: student entrance testing, diagnostic testing during instruction, and testing required for final evaluation of the student and for evaluation and revision of the model.

A. Student Entrance Testing

A battery of tests for assessing student aptitudes, achievements, and interests at the time of entry into the EBCE must be developed. Achievement tests must include measurement in the basic core and cognitive, personal, and social domains. These tests will be used largely to determine the placement of individual students in specific programs of the EBCE. Part of the entrance battery may consist of items and content taken from diagnostic tests used during instruction and from tests used in model evaluation.

B. Diagnostic Tests

Diagnostic testing serves a pedagogical purpose during instruction. It should be designed to assess the extent to which students have

acquired vocational knowledge and skill, and competence in the basic education and domain areas. Diagnostic testing will occur both during instruction and at the end of specific instructional modules. In addition to determining whether the student has met specific instructional objectives and is ready to move into new phases of instruction, diagnostic testing also provides information to permit the adjustment of instruction for particular students where deficiencies are identified. Diagnostic tests will include both knowledge tests and performance tests.

C. Evaluative Tests

Evaluative tests are designed to assess the instructional product both individually and collectively. They would be used to determine whether or not the student is to graduate and/or is able to assume responsibility in a job as well as to evaluate the effectiveness of the entire instructional system. When applied in the evaluation of individual students both norm referenced and criterion referenced tests will be needed. Criterion referenced tests are sufficient to meet requirements internal to the EBCE. Norm referenced tests, however, are needed to permit the student to move between the EBCE and conventional schools.

The final step in the development of the pilot program is the preparation of instruments for evaluating the entire instructional system. Model evaluation determines the efficacy of judgments that were made during the development of the pilot program about the appropriateness of particular instructional content, organization, and media. These evaluation instruments should be based on objectives only and

should be developed independent of any consideration of instructional content. To this end, construction of these tests will be accomplished by a group which has not been involved with content development, e.g., The Evaluation Group.

In the design of most instructional systems, once system adequacy has been demonstrated system evaluation can usually be dispensed with except for periodic quality control assessments. Since the EBCE instructional system is heavily based in individualized instruction and learner managed programs, the "model" can consist of as many different sub-models as there are students. It seems likely, therefore, given the possibility of an almost infinite variety of models, that it will not be feasible to dispense with system evaluation even after several successful demonstrations have been made.

XII. IMPLEMENTATION OF THE PILOT PROGRAM

Students to participate in the pilot program will be recruited by the consortium. Recruitment may involve not only contact with potential students but also with their parents. The educational-training sequence will begin. During conduct of the program student flow, information flow, and transportation procedures will be refined. Also, there will be continuing adjustment of components of the instructional program by the troubleshooting team.

XIII. EVALUATION OF PILOT PROGRAM BY EVALUATION GROUP

The pilot program will be evaluated primarily through evaluative testing and assessment of short term criteria such as: counts of the

number of students remaining in the program to completion, leaving the program to return to conventional schools, dropping out of any variety of school, going into jobs for which they were trained. This information will be supplemented by gathering additional information from involved businesses and industries, teachers in conventional schools, police and other members of municipal government, clergy, EBCE staff, students, and parents. While long term criteria cannot be used to evaluate the pilot program, such criteria will ultimately have to be considered in any final evaluation of the EBCE.

XIV. CONSIDERATION OF ALTERNATE INSTRUCTIONAL STRATEGIES AND PROGRAM MODIFICATION

When the evaluation data are assembled they will be reviewed by the evaluation group, the troubleshooting group, counselor-advisors, and the instructional staff. Where objectives are not being met, the system will require modification. Alternate instructional strategies, including those reviewed in the original study area papers and those introduced or dropped during the conduct of the pilot program, will be reconsidered. The program will be modified using the instructional strategies that give promise of rectifying system deficiencies.

XV. IMPLEMENTATION OF ADDITIONAL PILOT PROGRAMS

A second pilot program will be run incorporating all selected modifications. It will be evaluated in a manner similar to the original pilot program. If necessary, an iterative process will be adopted in which successive pilot programs are run and evaluated until a program

which meets all objectives has been developed. At that time a report will be prepared describing final procedures for full-scale implementation and management of the instructional model.